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THE SURGICAL TREATMENT OF TUMORS WITHIN THE SPINAL CANAL.[1]

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The recent studies into the subject of spinal tumors by Bruns, of Tubingen,[2] and by Schlesinger, of Vienna,[3] have been so thorough and so searching, and have so ably carried forward the earlier researches of Horsley, Starr, Sherrington and many others, that it will be long before they are displaced, and seldom that new generalizations of importance will be added to theirs. Schlesinger alone reports fifty-six new cases, and summarizes four hundred, of which one hundred and four come from the post-mortem records of the Vienna General Hospital, which described a total of thirty-five thousand autopsies. All cases are excluded from Schlesinger's list, except where it was expressly stated that the spinal cord was involved, and extradural granulation-growths are not ranked as tumors even when they compressed the cord.

In spite of this array of tumor cases, the number of actual operations is still so small that additional records still have clinical lessons to teach.

The first patient to whose case I shall refer was a lady, aged fifty-two years, whose symptoms, which were very serious, proved to be due to a distinct and easily removable intradural fibroma. The first signs of her

[1] Read at the meeting of the Association of American Physicians, May, 1899.
[2] Die Geschwülste des N. Systems, 1898.
[3] Beiträge zur Klinik des Rückenmarks und Wirbeltumoren, 1898.

illness showed themselves in the early part of 1897, in the form of severe pain, occurring intermittently at first, but in more and more frequent attacks, over the lower ribs and the left side and down across the abdomen into the left groin. Even a year or two before this she had had an attack of severe pain in the abdomen, for which no cause could be assigned, and which may have been connected with the growth of the spinal tumor; but this had been followed by a prolonged free interval.

In March, 1897, she consulted Dr. R. H. Fitz, whose notes say that the pain was in the region of the transverse colon at first, later in the direction of the descending colon. At that time he saw no reason to ascribe the pain to anything more than neurasthenic and digestive disorders. That summer she went on a driving journey, and this is interesting, because the fact that the jolting of the carriage over country roads did not increase the pain helped later to the conclusion that the vertebral column had not been primarily involved. It must, however, be admitted that even in cases where jolting does cause pain we should not be justified in concluding that vertebral disease is present, for in the second case that I shall describe, which is one of intramedullary tumor, that sign was present to a striking degree.

In July of 1898—that is, about six months after the first onset of the pain in a definite form—the patient began to notice difficulty in using the left leg, especially when she was obliged to raise the weight of the body onto the step of a carriage or in going up stairs. This is still her greatest difficulty. Slowly but steadily the pain and weakness increased, and it is a noteworthy fact that the former seemed to be closely associated with the condition of the bowels. Not only was the pain made worse by the effort attending an evacuation, which, as has been suggested by Lacquer, may increase the congestion of the intravertebral veins, but the presence of gas in the bowels caused her great distress, and the periods shortly before and shortly after a movement were especially painful times.

Increase of pain in connection with intestinal movements or constipation has been repeatedly noted in cases of this sort, but with our patient it was a striking feature. The very presence of the gas which seemed to cause her so much distress was perhaps due to a paralytic condition of the bowel-walls. In the report of Ransom and Thompson's case, it is stated that the pain was not worse after breakfast or dinner, but was worse after supper, "when he had some wind."

Slight movements of the head, especially toward the left side, and even opening the mouth widely, would also bring on severe pain. It is impossible to believe that the slight contraction of the dorsal muscles required for these movements could, in itself, have disturbed the inflamed nerve-roots to any considerable degree, but for any one who has studied the neuroses dependent on association, it is quite easy to believe that a

faint hint of possible further irritation, such as might attend really extensive movements of the vertebral column, could be given by these slight contractions, and would suffice to precipitate an explosion of pain.

In February, 1898, the patient consulted Dr. R. W. Lovett, literally crawling into his office, in the midst of an excruciating attack of pain which bent her double. From that time even to the present the bent-over position of the body has been assumed as the easiest one, and movements of standing still give rise to more or less discomfort, as they did then to intense pain. All through the spring of 1898 movements of every sort, and also the supine position, were very painful.

She was first seen by me in consultation with Dr. Lovett in the early part of June of the same year. At that time, although she looked in blooming health, she could walk only a few tottering steps, and not even those unassisted. The knee-jerks were greatly exaggerated, the left more so than the right, and ankle clonus was present. The sensibility to touch and pricking, which had previously been almost normal, was slightly, but only slightly, impaired over all the anterior surfaces of the legs and the lower part of the abdomen. At that time the pain, which had been most severe in the neighborhood of the groin, was most severe over the left flank and lower ribs, especially in the axillary line, where pressure was painful, as is indeed still the case.

The diagnosis of tumor at once suggested itself, as it had already to Dr. Lovett, and the question of operation was canvassed; but as she seemed to improve slightly, it was not decided upon until a few weeks later. Dr. Lovett had by that time been obliged to leave Boston for Europe, and left the patient in my charge, with the request to call in Dr. Warren to operate, if necessary, and this I shortly afterward decided to do.

Meantime, the impairment of sensibility and motion had increased until, at the time of the operation, the patient was unable to stand alone, and had begun to have considerable difficulty in controlling the bladder.

A careful examination as regards the sensibility, made three days before the operation, showed a very considerable impairment in the entire area of the distribution of the lumbar nerves—that is, over the anterior and lateral surfaces of the thighs, legs, and feet, although not everywhere to quite the same degree. This area of strongly marked impairment ceased abruptly at the groin on both sides, but slight impairment was observable over the whole abdomen, shading off gradually and finally disappearing at about the epigastric fold. On the whole, the sensibility of the left leg was distinctly better than that of the right, while the loss of motion there was much greater, a fairly certain indication that the left half of the cord had been invaded. Posteriorly, the impairment of sensibility was very much less, both as regards the

buttocks and perineum, the back, and the thighs. It was, in fact, only on careful tests that any impairment was discovered in these areas. The umbilical reflex was entirely absent for the left side, but was faintly present at the first trial on the right side. In the affected areas the sensitiveness to pricking, temperature, changes of position, and contact were all involved, though not everywhere uniformly.

The character and sequence of symptoms were typical of tumor, consisting, as they did, first in pain, presumably due principally to nerve-root irritation, then in signs of cord pressure, causing impairment of sensation and motion, beginning in the toes and following, to some extent, the "Brown-Séquard" type.

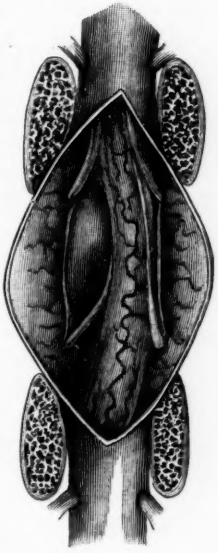
The course of the disease, the fact that pain had been felt over the lower ribs, and that the impairment of sensibility, though slight, was observable as high as the area of the ninth dorsal, coupled with the fact that the patient had never shown any signs of other malignant growths, or of vertebral disease, made it reasonable to hope that we had to deal with an extramedullary tumor, not primarily involving the vertebral column, and situated as high as the ninth dorsal segment. The high degree of exaggeration of the knee-jerks and the presence of ankle clonus, taken together with the fact that the sphincters had not been involved, early or severely, and that the area of distribution of the sacral nerves was relatively free from signs of impaired sensibility, made it evident that the growth did not seriously involve the lumbar enlargement.

Dr. Warren gives the following account of the operation:

An incision six inches long was made from the seventh dorsal to the first lumbar spines. The muscular mass was rapidly dissected off on each side from the spines and the transverse processes, and held back by a broad retractor devised by Dr. R. B. Greenough. Hemorrhage was controlled by gauze packing so effectually that it was found at the end of the operation that it had not been necessary to tie a single ligature. The spines of the lower four dorsal vertebræ were next removed with cutting forceps, and the laminæ of the tenth and eleventh vertebræ were cut away, disclosing the dura but showing nothing abnormal. On removing the laminæ of the ninth dorsal vertebra a swelling was noticed in the cord beneath, which gave to the touch of the finger a marked sense of resistance. On laying open the cord at this point by an incision about one inch in length, a tumor about the size and shape of an olive was disclosed lying in the meshes of the pia on the left side. So loose were its adhesions that it was readily removed by the gentlest of movements with a blunt instrument, and with the slightest possible hemorrhage, which was controlled by a gentle pressure of a few moments' duration. No pedicle was found. The dura was stitched with three silk sutures. The muscles were brought into apposition by a few buried silk sutures, leav-

ing a space for a temporary gauze drain. The skin was closed with silk-worm-gut, two provisional sutures being left at the point of drainage. A dry dressing was applied.

During the first days after the operation the paralysis of both sensation and motion was intensified, and a zone of hyperæsthesia, such as had not been observed before, covered the abdomen and lower part of the chest, making the re-application of bandages a very painful process. These results we attributed to the œdema and the disorders of nutrition following the great change in vascular tension. Slight and vague sensations in the legs were felt on the second day, but the first sign of voluntary motion, and that only of the very slightest, showed itself three days later, and improvement in this respect was extremely slow. The bladder and rectum were not fully under voluntary control for many weeks, and not at all for the first three weeks.



The distress and pain induced by the helplessness, the hyperæsthesia of the abdomen, the constantly recurring cramps of the muscles of the thighs, legs, and feet, made a good deal of the first month a trying period, though it did not pass without frequent indications of better things to come. Perhaps even the strange illusions and hallucinations as to the position of the legs and feet, and with regard to movements, with which she was constantly harassed, were in reality signs of promise.

It was noticeable that, as in the Gowers and Horsley case, some of the early efforts at voluntary motion excited a spasmodic contraction, or a movement that seemed such to the patient, though it was in fact a mixture of voluntary motion and spasm.

The first return of perspiration to the legs, which had hitherto been wholly dry, showed itself after several weeks, the moisture being at first confined to the popliteal space, then affecting those surfaces of the legs which were in contact with each other.

It is always instructive to note how the spinal centres in spite of long disuse and serious injury may retain their power of recuperation, but this was still more strikingly shown in the first case of Gowers and Horsley than in ours. Their patient, who had been wholly paralyzed for months before the operation, and remained so for a month after the operation, was able at the end of a year to walk three miles.

The case recently published by Eskridge is in almost every particular

a counterpart of the one here reported, but there, also, the improvement was more rapid.

On the whole, the history of the case since the operation has been one of slow but almost uninterrupted gain. At the present time the patient can walk fairly well with a cane, and short distances alone. Mounting the stairs or stepping into a carriage is very difficult without assistance from behind, but would doubtless be easier were the patient not so very stout. The body was for a long time bent strongly forward during attempts to stand and walk, but in this respect she has improved, though she has not wholly recovered. Every movement is possible, and most of them are fairly strong. She still has a good deal of pain from time to time, especially in the back and sides, but I am persuaded that to some extent these pains are due to association and habit, and persist mainly as an echo of the former condition.

A careful examination of the sensibility shows a very slight impairment, in all modes, over the greater part of the legs and abdomen, and even as high as the sixth rib in front; but, as before, there is hardly any impairment in the areas of distribution of the lower sacral nerves. There is still tenderness on pressure over the lower ribs in the axillary line, but this, too, I am inclined to attribute to the reviving of former associations. There is slight hyperæsthesia over the abdomen, as a reminder of the time when this was so great that the arranging of the bandage after the operation was a source of great distress. Her greatest discomfort is, however, a sensation of tension in the feet, causing a sense of "pulling" in the soles, and giving her a feeling as if the toes were being drawn upward, and until recently this has been associated with an actual hyperextension of the toes. Indeed, even now an effort of the will is sometimes required to overcome it. The knee-jerks, which remained extremely exaggerated for six months or more after the operation, have now become nearly normal, and ankle clonus has disappeared. Micturition is normal. The catamenia, which was absent for two or three months before the operation, has now become normal.

The points in which the case seems especially instructive are the following: The first is the wide extent of area over which pain was at times felt, which embraced the whole zone on the left side, lying between the groin, up to which point the loss of sensibility seemed to be almost complete to the epigastrium.

One must assume that the pain in the neighborhood of the groin was due not to the irritation of the nerve-root having its main distribution at that level but to that of a nerve-root given off one or two segments higher up, but reaching down to the point in question, for it is impossible to believe that this tumor could have extended down as far as to the origin of the twelfth dorsal root; and all the facts are fairly well accounted for if we accept the views of Sherrington, adopted by Bruns,

that every given area on the trunk is supplied with at least three overlapping nerves.

Another point of interest is that the abdominal pain, even from the outset, was increased by the evacuation of the bowels, and by distention with gas. I was at first inclined, as stated above, to attribute this to increase in the abdominal pressure interfering with the spinal circulation, but it seems to me now more probable that the pain was a referred sensation, occurring on the principles laid down by Head as the outcome of his well-known researches. Most of the cases which Head studied were examples of pain excited by the stimulation of a normal spinal cord through excitations arising from diseased viscera, while in cases like the present we have, perhaps, an example of practically normal visceral excitations translated into painful cutaneous sensations, in consequence of the abnormally sensitive condition of the cord at certain levels.

Another significant fact is that the sensibility in the area of distribution of the sacral nerves was so much less affected than that in the distribution of the lumbar nerves. This seems, to judge by the reports, to be a common occurrence in cases of dorsal tumors. It was noted by Starr in one of his cases, and is especially commented on by Eskridge, who thinks it may be a mark of value in the differential diagnosis of tumor paralysis and Pott's paralysis. For the present I record the fact without offering an explanation, though I think that one is needed.

Finally, I would call attention to the fact that the patient, though greatly improved, and able to walk slowly without the aid of a cane, and free from any considerable pain, is yet far from well. Her present condition still mirrors the distresses both of the time before operation and the convalescence.

The two cases which I have next to report may, I hope, bring encouragement to those who are inclined to operate, even where no radical cure is to be expected.

The first case is apparently one of endothelioma of the spinal cord itself, which has been causing symptoms already for nineteen years. The patient is a gentleman, now forty-three years of age, who was seized in 1880, while in robust health, with intense pain in the lumbar region of the back, from which he remained a great sufferer for the next two years. It is noteworthy, in connection with the fact that the tumor probably started from the pia, that the jolting of a carriage greatly increased the pain. At the end of a little more than one year signs of compression or injury of the spinal cord first showed themselves, in the shape of impairment of sensibility to contact, and apparently to changes of position, and slight impairment of motion, in the feet, while at the same time the pain diminished and finally disappeared. The

spinal cord symptoms continued to progress, until at the end of about nine years he became entirely paralyzed as regards sensation, motion, and control of the bladder and rectum.

In the intervening period the interesting dissociation of sensory symptoms showed itself, which was for a long time thought to be characteristic of intramedullary growths or syringomyelia, but which is now known to be the occasional result of pressure and other lesions. At a time, namely, when he could barely distinguish hot from cold water, and when only deep pricks caused pain, he could feel a fly walking upon the skin.

Some years after the paraplegia had become complete the patient's general condition grew so much worse that chances of relief were eagerly sought for. The cause of this state could not be positively ascertained, but he had lost much weight, his face appeared dusky, and he suffered greatly from frequent recurrences of singular attacks of sudden chill, followed by fever and sweating, of one, two, or three days' duration, which had occurred at intervals for a number of years, and have, indeed, continued to occur, though much less frequently and with much less severity, up to the present time. It was ascertained by careful investi gation that these attacks were not of malarial origin, and the most probable alternative diagnoses seemed to be urethral infection or some influence starting from the spinal disease.

Although it was recognized as quite possible that the new growth, which was obviously present, lay within the cord itself, still the chance of an extramedullary tumor could not be wholly excluded, as will be readily conceived by any one who has made a careful study of the data on which these diagnoses are based. Therefore, after consultation with Drs. Walton, Keen, and Warren, and by letter with Dr. Mills, of Philadelphia, an operation was decided upon, and was performed by Dr. Keen, in 1891.

The cord was found enlarged, and dark-gray or bluish in color, and as no sign of external disease was present, the wound was sewed up. The recovery from the operation was steady, and convalescence was no sooner fairly established than the patient's general health, strength, and flesh began to improve, so that he has been in all respects markedly better ever since. Indeed, at the present time, though the new growth has obviously invaded the cord as high as the lower cervical region, he is in excellent physical condition, and the fever turns are of rare occurrence.

The favorable state of affairs following this operation was temporarily interrupted in 1895, when he suffered for a number of months with severe grinding pain across the neck and shoulders and in the arms, evidently due to the irritation of the new growth. This was relieved at first by applications of heat and ice, and he then remained free for more

than a year. In December, 1897, however, the same pain returned, with increasing intensity, and grew steadily worse, so that toward the end of January it precluded sleep and became intolerable. After all measures that could be suggested had been tried in vain, I proposed to his physician, Dr. George Washburn, that another operation should be undertaken, at the site of the previous one, with a view of allowing cerebro-spinal fluid to drain off for some time, in the hope that changes in circulation and pressure might be induced which would at least break off for a time the habit of pain, for, as every one who is familiar with the treatment of neuralgias knows, the effect of habit counts for much in maintaining pain, and, on the other hand, a change of "set" of the nervous currents often serves to relieve it. The suggestion was an empirical one, but the result seemed to justify it. The operation was performed by Dr. Warren, who gives the following account: On February 10th the upper portion of the cicatrix was incised and the arches of the seventh, eighth, and ninth dorsal vertebræ removed. The cord at the seat of the old cicatrix was much thickened, and appeared like a soft sarcomatous tissue. Probing failed to reveal any collection of fluid. A gauze drain was left in and the wound was closed. The sinus formed by this drain closed in about two weeks, after the discharge of considerable cerebro-spinal fluid. A small bed-sore was easily controlled. An irritable spasmodic stricture caused some trouble at first, on the passage of the catheter, but finally yielded.

The patient never had another untoward symptom, except that for one week after the operation the numbness of the fingers of the left hand, by which he had been occasionally annoyed, increased. This, however, soon diminished, and is now less than before the operation. The pain ceased at once and has never returned.

The spinal cord at the point operated on seemed to have been converted into a dark-colored mass, not suggesting in any respect the normal cord. A piece of it which was excised, and afterward examined microscopically, proved to be made up of a mass of small round cells, probably endotheliomatous in nature. [Examination by Dr. E. W. Taylor and others].

The third case is of interest, from the relatively favorable outcome of operation in a case essentially incurable, and also because it is one where a sarcomatous growth seems distinctly to have been initiated by injury.

The patient, who at the time of my examination was a young man, aged twenty-four years, had had, three years before, a severe fall from a ladder, in the course of which his neck received a severe wrench, followed by stiffness and impairment of movement to the left, due, as I am inclined to believe, to a partial dislocation. He was able to return to work after six weeks, but in the two subsequent years his neck was

injured twice again. Six to eight months before I saw him he began to have difficulty in walking, then in the use of his hands, although, strangely enough, disorders of sensibility, either subjective or objective, have been trifling from first to last. The knee-jerks and wrist-jerks became exaggerated, and ankle clonus soon developed. Both legs and arms became wholly paralyzed, with the exception of trifling movements, and gradually the breathing became affected, so that eventually it was possible only through the diaphragm and accessory neck muscles.

When matters arrived at this point, and death seemed inevitable, he consented to an operation, which I had already advised. I had felt a prominent vertebral body in the pharynx, and believed it probable that he was suffering from caries of the upper cervical vertebræ, with extradural cord compression; but it should be said that my colleague, Dr. G. L. Walton, was less inclined to favor this view than that of sarcoma, which proved to be the correct one.

The operation was done by Dr. J. W. Elliot, on June 20, 1898. The posterior surface of the axis was found eroded, and on breaking it away with the forceps a sarcomatous mass was found beneath, which apparently penetrated directly to the spinal cord. This was removed and its base curetted, and the surrounding parts, which seemed also to be infiltrated by new growth, were cleared up as far as possible. The growth was pronounced by Dr. W. F. Whitney a giant-cell sarcoma.

The patient's breathing improved at once, and after a few days the voluntary motion began to return to both arms and legs. He left the hospital in three weeks much relieved, though still unable to walk alone. This improvement was soon followed by a relapse to a certain degree, but this again by renewed improvement some weeks later. Since then he has been gaining steadily, and is still gaining. An examination made within a month finds him in good flesh and color, breathing without effort, free from pain. He has no subjective impairment of sensibility consequence, and a careful examination shows that the sense of contact, temperature, pain, and position is almost but not quite normal below the neck. The breathing is still mainly diaphragmatic, but the costal muscles also act.

Almost all motions of both arms and legs are possible, and though weakness and rigidity and spasm still incapacitate him from getting about alone, he is able to do many things for himself, and looks forward, with apparent justice, to further improvement.

The number of the operated cases already published has increased from the twenty reported by Bruns, in 1898, to thirty three, which have been collected for us by Dr. Robert B. Greenough, who assisted Dr. Warren at both of his operations, and to whom we take this occasion to express our appreciative thanks. This list does not embrace the five

cases of pressure paralysis following Pott's disease, which were included by Starr in his table, nor Starr's own case of extradural tubercular tumor. It is true that these cases differ from the great majority of the Pott's paralysis cases, in that the pressure was exerted by thick masses of organized tissue-forming tumors on the dorsal surface of the dura; but, nevertheless, it seemed to me that a consideration of them would open the large subject of Pott's disease, upon which we could not enter.

Of the thirty-three operations reported in the table, seven led to recovery and ten to more or less improvement, although only in five of these latter, amongst which our first case was included, was the improvement considerable or lasting.

Among the cases reported as "recovered" there are two where the records are not sufficiently perfect to allow of verification of the statement. In one other case (Davies-Colley) the tumor removed was a sarcoma, so that although the patient was able to return to work the eventual outcome is perhaps uncertain.

In ten, perhaps twelve, cases operation seems to have hastened death, which occurred five times through meningitis, septicæmia, or hemorrhage (once, in a case of epithelioma); five times through shock, exhaustion or other causes. It is fair to believe that with improved methods of operation and diagnosis the danger from some of these agencies would diminish, but at the worst the figures show but one out of three chances for hastened death against even chances for some improvement.

In nine cases the operation seems to have made little difference in the progress of the case, and it should be remembered that even with the others the death which was hastened was bound to occur soon at any rate.

The really satisfactory cases for permanent or complete recovery or substantial improvement are few in number. The best results were in the three fibroma cases, in one, each, of psammoma, lipoma, and sarcoma, and in two of echinococcus. The occurrence of the two last fibroma cases (Eskridge and Freeman's, and ours), so near together might suggest that they are of frequent occurrence, but in fact they are separated by twelve years from that of Gowers and Horsley, which was the first successful case ever reported, and which did so much to stimulate the surgeon's hope.

It is interesting to note that in spite of the difficulty—or impossibility in some cases—of deciding positively as to the exact position of a tumor, or even whether it is inside or outside the cord itself, no case *has been reported* where an operation was done on a wholly mistaken diagnosis. In one case, however, the tumor was missed because it lay above the incision, and in another, contributed by Bruns himself, a growth which was supposed to be extramedullary proved eventually to be a diffuse sarcomatous infiltration of the roots and outer portions of the cord.

SPINAL TUMORS OPERATED ON.

No.	Reporter.	Reference.	Date.	Tumor.	Height.	Situation.	Result.
1	Bruns and Kredel.	Arch. Psychiatrie, Bd. xxviii.	1892	Sarcoma.	9 D to lower lumbar	Intra-dural.	Death.
2	Bruns and Lindemann.	Neurol. Centralbl., 1894, p. 359.	1894	Sarcoma.	3 to 6 D	Extra-dural.	Death in 1 day.
3	Church and Eisendrath.	Amer. Journ. Med. Sci., 1892, p. 395.	1890	Spindle-cell sarcoma.	4 to 5 D	Intra-medull.	Death in 4 days.
4	Clark.	Brain, 1895.	.....	Endotheli-oma.	Lower C	Extra-dural.	Death from hemorrh'ge
5	Curtis.	New York Record, March 5, 1898.	1898	Cancer.	6 D	Extra-dural.	Death in 16 days.
6	Davies-Colley	Clin. Soc. London, 1892, p. 163.	1892	"Fusiform" spindle-cell sarcoma.	5 to 6 D	Extra-dural.	Recovery.
7	Eskridge and Rogers.	Phila Med. Journ., Feb. 19, 1898.	.....	Tumor of vertebræ.	4 to 5 D	Extra-dural.	Death in 9 days.
8	Eskridge and Freeman.	Phila. Med. Journ., Dec. 10, 1898.	1897	Fibroma.	3 to 4	Intra-dural.	Recovery.
9	Gerster.	N. Y. Med. Journ., 1892.	.....	Sarcoma.	5 D	Intra & extra-dural.	Improve-ment.
10	Gowers and Horsley.	Med. Chir. Trans., 1888, p. 407.	1887	Fibro-myx-oma.	3 to 4 D	.....	Recovery.
11	Horsley.	Brit. Med. Journ., 1890, part II.	.....	?	.....	Intra-dural.	Death in 1 day.
12	Horsley.	Clin. Journ., Lond., 1896–97, ix. p 177.	.....	Echinococ-cus.	(3L n'rve) 12 D V	Extra-dural.	Recovery?
13	Ignatoff.	Vayenno Med. Journ., St. Peters-burg, 1896, I sect. clxxxvii. pp.30–32.	1894	Chondro-sarcoma.	5 to 7 D	Extra-dural.	Improve-ment.
14	Kümmell.	Arch. klin. Chir., 1895, Bd. l.	1893	Sarcoma.	3 to 4 D	.....	Improve-ment.
15	Lichtheim and Mikulicz.	Deut. med. Woch., 1891, p. 1386.	1890	Psammoma.	9 D	Intra-dural.	Death in 2 days.
16	Lichtheim and Mikulicz.	Deut. med. Woch., 1891, p. 1386.	1890	Psammoma.	4 D	Intra-dural	Marked im-provement.
17	Lloyd.	Amer. Med. Surg. Bull., New York, 1896, x. p. 659.	1896	Echinococ-cus.	8 D to 5 L	Extra-dural.	Recovery.
18	Laqueur and Rehu.	Neurol. Centralbl., 1891, p. 193.	.....	Lymphan-gioma.	Sacrum	Extra-dural.	Marked im-provement.
19	Munroe.	To be published later.	.....	Sarcoma.	Lumbar	.....	Death.
20	Pescarolo.	La Riforma Med., 1892, X. Internal. Cong., Berlin, iv. p. 59.	.....	.....	2 to 5 D		
21	Putnam and Elliot.	.....	1899	Sarcoma.	2 and 3 D	Cerv. vert.	Improve-ment.
22	Putnam and Warren.	.....	1899	Fibroma.	9 D	Intra-dural.	Great im-provement.
23	Quensel and Garten.	Neurol. Centralbl., 1898, xvii. p. 482.	1896	Sarcoma.	7 to 8 D	Extra-dural.	Death in 6 days.
24	Ransom and Anderson.	Brit. Med. Journ., 1891, ii. p. 1144.	.....	Echinococ-cus.	10 D	Extra-dural.	Death in 3 days.
25	Ransom and Thompson.	Brit. Med. Journ., 1894, i. p. 395.	.....	Round-celled sarcoma.	8 D	Extra-dural.	Death in 6 days.
26	Roy.	N. Y. Med. Rec., 1890, ii. p. 564.	1890	?	9 to 12 D	Intra-dural.	Recovery.
27	Sänger and Krause.	Munch. m. Woch., 1894, p. 22.	1894	Sarcoma.	6 D	Extra-dural?	Death in 4 days.
28	Sonnenburg.	Verh. deut. Gesell. Chir., 18th Cong., Berlin, 1889.	.....	Sarcoma.	Lower D	Extra-dural.	Death in 6 weeks.
29	Starr and Abbe.	N. Y. Med. Rec., 1890, p. 85	.....	Sarcoma.	8 to 9 D	Extra-dural.	Death in 9 days.
30	Starr and McCosh.	Amer. Journ. Med. Sci., June, 1895.	.....	Sarcoma.	5 D (7 D)	Extra-dural.	Death in 21 days.
31	Starr and McCosh.	" " "	.....	Lipomata.	Lumbar	Extra dural.	Imprvem't; death in 6 mos. from upper dorsal caries.
32	Szekeres.	Pester Med. Chir. Presse, 1894, p. 43.	.....	Echinococ-cus.	.....	Extra-dural.	Recovery.
33	Welms and Trendelen-burg.	Beitr. z. klin. Chir., 1898, xxi. p. 151.	1896	Echinococ-cus.	2 L to sacrum	Extra-dural.	Death in 6 mos. from amyloid.

A few cases—not operative—are on record where the diagnosis, though carefully made, proved wholly erroneous.

How large is the surgeon's field for operation in the spinal canal? This is a question which the physician has to consider, in view of the great uncertainty which must attend his diagnosis as regards the exact position of the tumor—namely, whether it lies dorsally or ventrally with relation to the cord. The possibility of drawing the cord aside to a certain extent, cutting one or two dorsal nerve-roots, if necessary to accomplish it, has been contemplated by various surgeons. In fact, Kümmell[1] removed a laterally-placed sarcoma of the body of a vertebra and scraped out the cavity, but no tumor has, to my knowledge, been removed from the ventral portion of a vertebral body.

It is an important inquiry how nearly, in the cases which are counted as successful, such as the first of those reported by us, the improvement is likely to approach absolute recovery; to what extent the degree of probable improvement may be foretold; and what signs make its occurrence improbable.

Very few cases are actually at our command—if we omit those of Pott's disease—for answering this question. In most of the cases that ended in recovery the paraplegia had been complete but for a very brief period, but in the Gowers and Horsley case it had existed for several months. In Pescarolo's[2] case, where the patient had been paralyzed for some years, there was no improvement at the end of five months after operation. No one need be disappointed at the occurrence of a temporary increase of paralysis after operation, or at a delay in the onset of signs of improvement. Some return of sensibility is likely to show itself by the end of a day or two at the latest, but no voluntary motion may occur for one or two weeks. The earlier movements, as in the Gowers and Horsley case, and in ours, although initiated by voluntary effort, may seem to the patient, and at first to the physician, to have all the character of involuntary spasm.

It is probable that, as a rule, the prospect is better in the cases where the paralysis develops slowly, as from the gradually increasing pressure of the large flat masses of inflammatory exudation met with in Pott's disease, than where it comes on rapidly, since in the latter case the nerve-elements and bloodvessels do not have the same opportunity to accommodate themselves to the lessening space. In cases of the former sort, a delay of a few weeks, or even days, in operating may be of far more consequence than that of an equal number of months under other circumstances.

Schlesinger points out, and his opinion is corroborated by that of others, that the cause of the paralysis is complex, and that it includes

[1] Arch. für. Chirurgie, 1895.

[2] Citation by Bruns.

the effects of pressure, anæmia, necrosis, œdema, and also of inflammation. The latter element is of special importance, because, in the opinion of Horsley[1] and others, it is liable to increase after operation, though, on the other hand, Allingham offers evidence that it may occasionally diminish. Indications that the cord is not only compressed but softened are, however, in Bruns' opinion, not a positive contraindication to operation.

To what extent is it worth while to operate where there is little prospect of inducing a cure? This is a question which each physician and surgeon must answer for himself, and with reference to the individual circumstances of each case. I do not, myself, believe that the surgeon should throw the decision too much upon the patient. The alternatives which he is bound to offer (let him express them as simply as he may) are bound to be bewildering, and the choice which the patient makes is far less likely to be a good one than that which the conscientious physician can make for him.

Bruns believes that when the diagnosis of tumor is fairly made it is usually best to operate, but that this diagnosis can rarely be conclusive until signs of actual cord pressure have appeared, and even then the outcome is largely a lottery.

The second and third cases reported by us give some ground for greater hopefulness in prognosis than an interpretation of reported facts in the light of our narrow knowledge might seem to justify. Sometimes the operation appears, in accordance with some subtle principle, to induce to a new "set" to the tendencies at work. The tumor may perhaps be led to grow in a new direction; or, as in the second case reported by us, the temporary relief to pain may introduce a fairly persistent relief. The history of neuralgias of other sorts gives abundant illustrations of this sequence. Thus the biographer of Lord Lawrence tells how, while he was Governor of the Northwestern Provinces of India, and had been for a long time a sufferer from facial neuralgia—usually so intractable—the news was brought of the outbreak of the great mutiny, which compelled him to work day and night in despatching troops. Under this powerful stimulus, and in spite of fatigue, the neuralgia disappeared, never, it is said, to return.

Cases of intramedullary tumor, as one might suppose, have never been operated on successfully. The nearest approach to this was in the case of Church and Eisendrath, where a well-defined spindle-celled sarcoma was removed from the posterior half of the cord. Unfortunately the wound became septic; had it not been so, the writers think the patient might have done well. Horsley[2] and Crofts (cited by Horsley) have tapped, the one the cavity in a case of syringomyelia (case of Gowers), the other a "cyst"; but with only temporary improvement. I have

[1] British Medical Journal, 1890. [2] Ibid.

done a "lumbar puncture" in a case of syringomyelia, hoping that the altered circulatory conditions might bring relief to the persistent pain, but without effect.

Finally, I would say, in spite of not wishing to enter on the large subject of the localizing diagnosis of tumors, that physicians and surgeons who have such cases in charge can do good service by making very careful observation as to the exact areas in which the sensibility is altered, and the character of this alteration. It will be generally found that, in spite of many routine statements to the contrary, it is not the line of the ribs, but lines more or less at right angles to the long axis of the body, that are followed by the upper margin of the affected surface, and that the back and the sacral areas tend to escape unless the lumbar portion is involved, and occasionally—contrary to the usual statement—with tumors compressing the cauda equina. [Lacquer.] It may also be noted that pain occurs sometimes when no cause can be assigned, and fails, as in our third case, where it would pre-eminently be expected. (This latter will, I think, be oftenest noted with tumors of the cervical segments.)

It is an interesting fact, that in the diagnosis of spinal tumors as regards localization, and in framing an explanation of the symptoms, we have now begun to draw on more subtle principles than those of anatomy. Prominent among the newer studies in this direction are those of Head (*Brain*, 1895), whose researches were primarily undertaken for the investigation of the relation between disorders of the viscera and the hyperæsthesia of definite areas of the skin. Head finds that his skin-areas correspond neither to the distribution of peripheral nerves nor of the spinal nerve-roots, and believes that they represent spinal segments of the gray matter. The boundaries of his areas do not run parallel with the ribs, but are at right angles with the long axis of the body, thus corresponding with a type of arrangement which has been repeatedly noted in descriptions of sensory disorders resulting from spinal tumors. He also calls attention to the fact that the increased sensitiveness of the skin, associated with visceral irritation, is not a real increase of the contact sense, but is to be classed as a painful affection—*i. e.*, as a hyperalgesia and not a true hyperæsthesia. This is also true of the area of sensitiveness which lies just above that of anæsthesia in tumor cases.

It can hardly be doubted that some of the curious relationships between certain conditions of the visceral organs and the pain, in spinal tumor, are best explained by the aid of Head's observations. Thus in our first case one of the most serious causes of exacerbations of pain was the slight distention of the bowels with gas, and the conditions present immediately before and after a movement. One might possibly adopt the explanation suggested by Lacquer for the pain attendant on strain-

ing at stool—namely, the disturbance in the abdominal and secondarily the spinal circulation, but it is at least an equally reasonable hypothesis that the effect was due to the slight but additional irritation of the affected segments of the spinal cord. Even though the pain was not strictly confined to the cutaneous areas most closely related to some particular viscus, but represented only an increase of the habitual pain due to the tumor, the same explanation would hold good, for Head's observations show that these sensory reflexes follow a law similar to that which governs motor reflexes, in that two factors are at work. As soon as any stimulus reaches the gray matter of the spinal cord it instantly diffuses itself, and although the effect most likely to follow will tend to confine itself to the level at which the nerve conveying the stimulus first terminates, yet if a peculiarly irritable condition of the gray matter exists at another level the response may come from that, and the next time the same result may occur more readily through the action of the law of association and habit. It is in the same way, I think, that the effect of gaping and sneezing, and even, as in our case, slight movements of the head and face, come to exert such a strong influence in exciting pain. It is doubtless true that these movements produce slight changes of tension within the spinal canal, but these must be so slight that they would fail to be effective for harm had they not been at the same time associated with stronger movements which were capable of drawing, to a material degree, on the inflamed parts.

The consideration of our first case calls to mind another point of both theoretical and practical interest. It was, namely, very noticeable that the areas supplied by the lower sacral nerves—that is, the well-known saddle-back area—retained its sensibility to a far greater degree than that supplied by the lumbar portion of the cord, although that was wholly below the point of pressure. This condition of affairs is found repeated in many of the observations, and Eskridge calls attention to this as perhaps characteristic of tumor cases. One may offer theoretical explanations based on mechanical principles, but the fact is worthy of being placed side by side with the observations (not invariably correct) [Lacquer], that when the cauda equina, as a whole, is injured, it is preeminently these same lower sacral nerves, though they occupy a protected position in the middle of the aggregate bundle, which are most affected; and also with the fact pointed out by Bruns, that the root symptoms provoked by intradural but extra-medullary tumors are usually referable not to pressure upon the nerve-roots in their course but to pressure exerted at their point of exit from the cord.

With regard to the favorable results which followed operation in the second and third cases reported by us, it would be hazardous to assert that they are so clearly attributable to the operation as to justify repetition of the procedure in similar cases. This is not the first time that the

spinal canal has been opened in cases of intramedullary tumors, though sometimes the condition actually found was a surprise. This happened in the case reported with such care by Bruns, and there also a considerable degree of improvement as regards pain did, as a matter of fact, follow the operation.

The consideration of the lesions met with in these compression cases, as shown by the history of Pott's disease, myelitis, and of the tumor cases reported by Bruns, Schlesinger and others, suggests reasons enough why the improvement in some of these cases is so much greater than it is in others. For some reason not clearly definable the effects of compression sometimes lead to hemorrhages and necrotic softening, both at the point of the greatest narrowing and occasionally a little higher than this as well, while at other times such lesions are wholly absent, although the stricture may reach a high degree.

A FIFTH CASE OF "FUNGOUS FOOT" IN AMERICA.

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AND
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The history by Dr. Arwine is brief, but the best that could be obtained.

Pedro B.; was born in Southwestern Texas; of Mexican parentage; aged forty-five years; married; six children. Family history good; no history of syphilis. He lived on a ranch thirty or forty miles from Fort Ringgold; had never lived elsewhere. The disease began about the year 1887 with severe pain in the left foot, lasting thirty-six hours. After this a red spot appeared on the foot. The man had chills and fever; no cause for the condition was known. Throughout almost the whole course of the disease the pain continued; it was most severe at night, and was worse in summer than in winter; toward the last it subsided. The only treatment was the use of a few simple household remedies. The local physicians diagnosticated elephantiasis, and advised amputation.

He came to Dr. Arwine on March 5 (or 6), 1889, complaining of the leg being too heavy to carry; there was then no pain. On the 16th Dr. Arwine amputated; there was but little shock; about eight arteries in addition to the tibials, all of which were much enlarged, were tied. Recovery was complete and without event; the more gratifying because the man's surroundings at the time of the operation were quite unsanitary.

The amputated part was sent to the Army Medical Museum, but was not in good preservation when received. It is numbered 11,699 in the pathological series, and consists of the left foot and lower half of the

leg. The foot and ankle are much enlarged, and show the characteristic *buttons* of fungous foot (mycetoma, Madura foot, fungous foot of India); the buttons vary in size, and are most numerous and closely set on the dorsum of the foot (Fig. 1). The subcutaneous tissue shows

FIG 1.

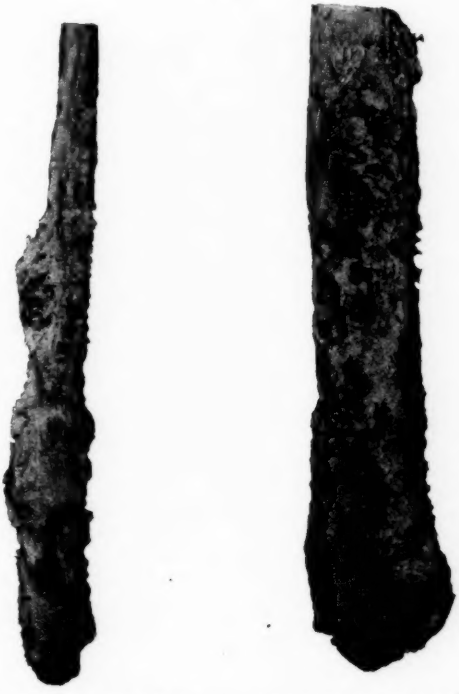
From photographs taken by Dr. W. M. Gray, Army Medical Museum.

numerous sinuses and fistulæ filled with oily and white, pasty matter, mixed with innumerable rounded, brownish bodies measuring 0.5 to 2 mm. in diameter. The bodies were sometimes in masses, the diameter of a centimetre, and were most numerous near to and beside the bones. All the bones were honeycombed with cavities and fistulæ, in which were similar masses; the bones of the foot were so friable that they could scarcely be handled. The tibia and fibula (Fig. 2) showed hyperostosis, especially in the upper part of the amputated portion; and as this was the part most recently affected by the disease, it seems probable that, so far as the bone is concerned, hyperostosis is the first effect of the irritation of the fungus. In some places, particularly around the ankle, was a dense mass of connective tissue (in one place nearly an inch thick), the result of the inflammatory process. The bones are mounted as 11,725.

Dr. James Carroll, of the Army Bacteriological Laboratory, makes the following statement in regard to the microscopical characters of the tissues and fungi:

The specimen gave off a very disagreeable odor, showing that it was not in a good state of preservation. A portion of the skin and underlying tissue was removed from the posterior surface of the leg for embedding.

FIG. 2.



Outer side of tibia and inner side of fibula; shows hyperostosis, osteitis, and fungous masses in the cavities. (From a photograph taken by Dr. Gray.)

Small hempseed-like bodies were found in considerable numbers free in the connective-tissue spaces and sinuses. They were of a yellowish-brown color, some darker and some lighter, generally rounded or lobulated in outline, and their surfaces slightly roughened. In size they varied from about 1 to 3 millimetres.

These seed-like bodies were easily crushed upon a slide, and appeared to consist of a dense, brittle, cortical layer, enclosing a central grayish, pulpy mass of pultaceous consistency. All attempts to identify the structural elements of these bodies resulted in failure. They were macerated in water, caustic potash solution, etc., and were crushed and examined in the fluids, or were dried upon the slide and stained by various methods, but no positive evidences of a mycelium or other definite structure could be determined. The central pulpy material appeared

to have undergone complete disintegration, and in consistency was almost caseous. The cortical layer broke up into vitreous, yellowish, brownish, or colorless granular masses which showed no distinct striation or other definite arrangement.

Among the stains tried were thionin and Weigert's modification of Gram's method. With tissue sections complete failure was the result in all attempts to stain the cell nuclei. Nothing better could be obtained than a diffusely colored structure, the minute details of which could only be recognized by differences in the form and arrangement of its components. Large numbers of mastzellen were found uniformly scattered throughout the subcutaneous connective tissue. These were not more numerous in the vicinity of the fungous masses than elsewhere, and they were easily recognized under the immersion lens by their form, their very numerous hæmatoxylin-tinged granules of uniform size, and by their nuclei, which could often be seen as clear, unstained bodies, somewhat like the nucleus of a malarial parasite.

A conspicuous feature of the section was the presence in many of the lymph-spaces adjacent to the fungi of abundant amorphous granular material of a yellowish-brown color, which was very refractive. This was probably hæmosiderin. In other lymph-spaces, and, indeed, in some of those containing the above-described pigment, there were aggregations of finely and coarsely granular material, which stained a little more darkly with hæmatoxylin than any other element in the tissue.

I was unable to satisfy myself as to whether these were small portions of the fungus or cell detritus. As between the two I would incline rather to the former than the latter explanation, for the reason that in the immediate vicinity of the fungi, where numerous pus-cells were present, no such picture was obtained.

Other than these the section showed no traces of the minuter elements of the fungus apart from the small, club-shaped peripheral rays attached to the hempseed bodies now to be described.

The section was made to pass vertically through one of the elevations upon the skin, which, apparently, marked the outlet of a discharging sinus. Within the sinus, which in the stained section was 3 to 5 mm. in diameter, six small, seed-like bodies could be counted upon the slide with the naked eye.

Several of these projected above the level of the skin into the pouch-like sac upon the surface. The walls of the sinus were formed of distinct lines of connective tissue. Just within the wall and around and between the fungous bodies large numbers of pus-cells could be seen with the microscope. These were easily recognized, because in places a number of them showed characteristic nuclei in the sections stained with hæmatoxylin and eosin.

Under the low-power the hempseed bodies were found to be made up of aggregations of smaller masses, some of which were rounded, others fan-shaped, reniform, or lobulated. One or two showed a fernleaf-like branching arrangement. Many of these smaller units exhibited a distinct radial striation, which could be followed from the periphery to the centre, or, in the fan-shaped bodies, to the base or pedicle. The majority showed at the periphery a marginal zone of very small, club-shaped rays, which were remarkably symmetrical in form and arrangement. The central radial striations of the larger bodies were seen to be continuous with the lines of contact of these delicate rays about the

periphery. In many of them a rather indistinct concentric striation could also be distinguished.

FIG. 3.

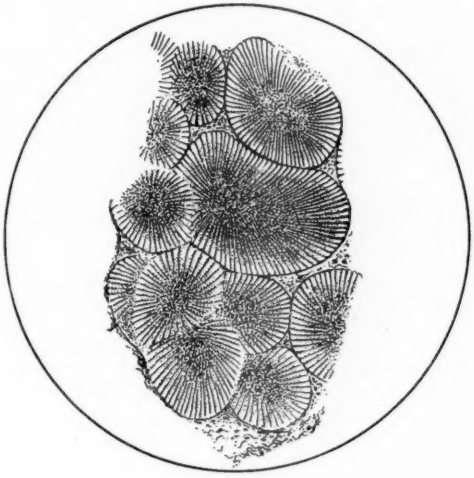
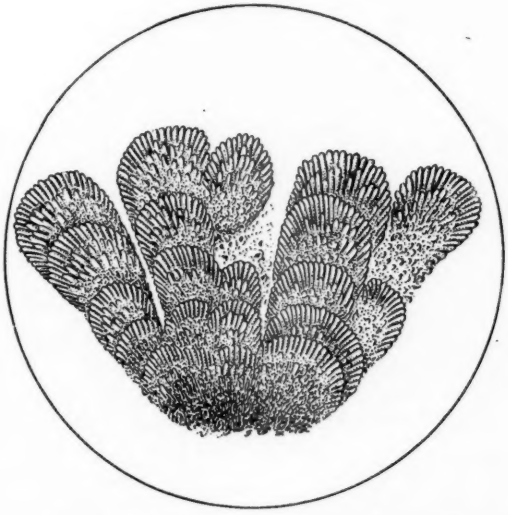


FIG. 4.



The above description applies to the section stained with hæmatoxylin and eosin. Gram's method proved of no service with these specimens.

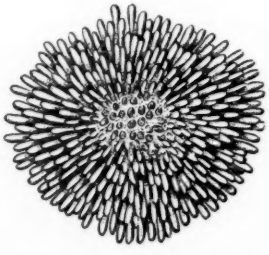
Saffranin yielded a very good picture of the gross masses with their peripheral rays and general striation. With thionin exquisite preparations were obtained, which began to fade, however, in a few days.

The accompanying pen-and-ink drawings were made from thionin and saffranin stained sections by Dr. J. C. McConnell, of the Army Medical Musuem.

Fig. 3 (saffranin) shows the arrangement of the smaller units into the larger masses, the whole picture probably representing one of the isolated hempseed bodies. In the section from which the drawing was made the centres of the bodies were somewhat denser than shown in the drawing; they presented more of a homogeneous, finely granular appearance, with a less distinct striation, except as to the periphery, where it is plainly marked. Apart from the lines where the druses are in contact with neighboring contiguous ones, the margins should be undulating, as they appear in Fig. 4.

Fig. 4 (thionin) shows in a beautiful manner the larger half of a hemispherical mass, consisting of imbricated processes arising as branches from a central stalk or base. The minute club-shaped elements were almost as distinct in the specimen as they appear in the drawing, and the interspaces between the processes were occupied by emigrated polymorphonuclear leucocytes, by which also the fungous mass was to a large extent surrounded. This body was situated in the sac-like expansion formed at the opening of the sinus upon the skin.

FIG. 5.



In Fig. 5 is shown a small body that was completely isolated. In my opinion it should be interpreted as a cross-section through the extremity of a process similar to those shown in Fig. 4.

After a study of these sections I have no hesitancy in pronouncing the fungus a variety of actinomyces. It is much to be regretted that the imperfect preservation of the tissue precluded any histological investigation of the lesions resulting from its presence.

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Acting Assistant Surgeon U. S. Army.

The photographs of the leg and foot and bones of the leg were made by Dr. W. M. Gray, of the Army Medical Museum. One shows well the characteristic *buttons;* the other, the fungous masses on and in the bone.

The cases thus far reported from America are as follows: Adami and

Kirkpatrick (*Transactions of the Association of American Physicians*, 1895, vol. x. p. 92): Male, aged twenty-one years; Canada; ten years' chronicity, right side of the body. Hyde and Senn (*Journal of Cutaneous and Genito-urinary Diseases*, New York, 1896, vol. xiv. p. 1): Male, aged twenty years; United States; thirteen years' chronicity, left side of the body. Pope and Lamb (*New York Medical Journal*, 1896, vol. lxiv. p. 386): Male, aged twenty-seven years; Texas; eight years' chronicity, right side of the body. Wright (*Transactions of the Association of American Physicians*, 1898, vol. xiii. p. 471): Female, aged twenty-six years; Italy and United States; six months' chronicity, left side of the body. Arwine and Lamb: Male; aged forty-five years; Texas; twelve years' chronicity, left side of the body.

It is probable, as suggested by Prof. Adami, of Montreal, that a careful examination of museums would disclose additional specimens; it is probable, also, that many cases of this disease have been erroneously diagnosticated as elephantiasis. Inasmuch as the two American cases in possession of the Army Medical Museum came from Texas, it would seem likely that that section of country would be an inviting field for research. Since, also, in India at least, the disease is found almost exclusively among the peasantry who go barefoot on the soft-ploughed ground, tropical and semi-tropical America ought, theoretically, to furnish many more cases than the few which have been reported.

The subject has been written up so fully by previous reporters that it seems unnecessary to do more than refer to their papers.

SOME FACTS IN REGARD TO ANEURISM OF THE AORTA.

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The occurrence of a number of cases of aortic aneurism in the practice of one of us (Hare) has led us to the study of the literature of this subject, with the object of determining certain statistical points in connection with this very interesting pathological condition, and we have analyzed the histories of 953 cases, taken at random from the reports of the clinicians in this country and abroad.[1]

We have not attempted to make a study of the relative frequency of aneurism in the thoracic aorta as compared to aneurism of vessels in

[1] These statistics are taken from London Hospital Reports, the Transactions of the Pathological Society of London, the New York Pathological Society, the Philadelphia Pathological Society, and files of current periodicals, and not from any series of cases previously collected.

other portions of the body, but our endeavor has been to obtain information concerning the most common location for the development of the growth, its usual cause, the direction of its development, the frequency of the disease in the two sexes, the symptoms most commonly produced by aneurismal growths in different situations in which they occur, and the most common cause of death. In connection with these important topics we have also collected information in regard to other matters of almost equal interest.

In order that our study may be as clear as possible, we have divided the aorta, as it is commonly divided, into the ascending, transverse, and descending portions of the arch, making a fourth division of that portion of the aorta which extends from the descending portion of the arch to its point of exit from the thorax through the diaphragm.

It is a well-known fact, that syphilis and alcohol, or perhaps hereditary weakness of the arterial walls, are particularly prone to result in aortic aneurism in persons who are subjected to violent vascular strains, or whose vessels present beginning degenerative changes due to advancing years, it being remembered that the old saying "A man is as old as his arteries" holds true in this connection, for syphilis and alcohol may produce changes in the bloodvessels at comparatively early periods of life, which correspond somewhat to those which are seen many years later in perfectly healthy individuals.

It is also a well-recognized fact in the literature of aneurism that the majority of these growths are saccular rather than fusiform.

We have collected from medical literature 570 cases of aneurism of the *ascending portion of the arch*. Of these, 544 were sacculated and 466 occurred in males and 78 in females. The remaining 26 cases were fusiform, and all of these 26 aneurisms occurred in males. These statistics seem to us of interest as confirming the general opinion in regard to this lesion, and emphasize very forcibly the far greater frequency of sacculated aneurism than the fusiform variety. When we consider that of nearly 1000 cases analyzed, aneurism of the ascending arch occurred no less than 570 times, while aneurism of the transverse arch occurred only 104 times, and of the descending portion 110 times, the great difference in frequency is marked.

Of the 466 cases of sacculated aneurism occurring in males, it is interesting to note that the great majority of them occurred in persons between thirty-five and forty-five years of age; that the next greatest frequency was in persons between twenty-five and thirty-five, then between forty-five and fifty-five, and so on down, as is shown in the accompanying table:

	15 to 25	25 to 35	35 to 45	45 to 55	55 to 70	Total.
Males	26	100	170	86	21	403
Females	2	14	30	16	10	72
Unknown	...	...	...	...	...	69

The statistics in regard to fusiform aneurism affecting the ascending portion of the arch are not sufficiently clear to enable us to reach such positive conclusions, thus:

No cases	were	found	between	the	ages	of	15	and	25
8	"	"	"	"	"	"	"	25	"	35
7	"	"	"	"	"	"	"	35	"	45
4	"	"	"	"	"	"	"	45	"	55
3	"	"	"	"	"	"	"	55	"	70

The sex was stated in 22 cases; in the remaining 4 of the 26 no statement as to sex was made. No case is stated to have occurred in a female.

Passing on to the consideration of the most common cause of aneurism of this portion of the arch, we find among the males that no less than 30 patients were considered to be perfectly healthy as far as any causative disease was concerned; that 28 had a history of syphilis; that 45 suffered from alcoholism, and 3 of these 45 had as an additional history of exposure to trauma; 17 are said to have been due to rheumatism; 4 to syphilis and alcohol combined; 47 to trauma, and in the remaining 295 no statement as to the probable cause of the disease was made.

It is interesting in this connection to note that alcohol was considered the cause in such a large majority of the cases, almost equalling trauma in frequency, and it seems to us also of interest that syphilis is reported as the cause in but 28 cases—in other words, falling far below alcoholism in importance as a cause-factor.

Among the females we find that but 3 were considered healthy; that 4 had syphilis, although 1 of these 4 gave a doubtful syphilitic history; 6 suffered from alcoholism, 1 of these being also doubtfully syphilitic; 5 had rheumatism; in none were syphilis and alcoholism associated; 25 were ascribed to trauma, and in 35 the cause was unstated. The number of cases recorded in females is, once again, too small to enable us to reach positive conclusions; but it is interesting to note that in this sex also trauma far exceeds all other causes in the production of the disease, and that alcoholism and syphilis, while far below trauma in importance in producing the lesion, are the next most frequent causes.

Another interesting fact worthy of attention is that syphilis and alcoholism are ascribed as the cause in a very small percentage of cases in females as compared to males.

In the fusiform variety it is stated that 6 of the males were healthy; in none of them was syphilis considered the cause of the disease; in 2 alcoholism was given as the cause; trauma was the cause in 4, syphilis and alcohol in 1, and in 13 no statement as to the cause was made.

Death occurs as a result of aneurism of the aorta either from rupture of the aneurismal sac, from the pressure of the sac upon important

nerves and bloodvessels, or from the secondary changes which take place in these tissues and in other vital organs as a direct or indirect result of such pressure. Among the causes of death other than rupture in the sacculated variety of aneurism of the ascending portion of the arch, it is interesting to note that dyspnœa is described as the most common cause, death being due to this condition, according to the reports, in 17 cases. The next most common cause is stated to be exhaustion, which produced death in 15 cases; serous pleural effusion resulted in death in 12; serous pericardial effusion in 7; suffocation is stated to have been the cause of 7, while only 2 are thought to have been due to congestion of the lungs, 2 to pneumonia from pressure, 2 from bronchitis, 2 from exhaustion due to leakage from the aneurism; 2 are credited to apoplexy of the lung, 2 to pleurisy, 1 to pleural pneumonia, 1 to suffocation from pressure on the trachea.

Among the females 9 are said to have died of exhaustion, 1 from abscess of the lung, 3 from dyspnœa, although in all probability 1 of these cases was due to rupture, since the external tumor suddenly disappeared just before death, but no autopsy was permitted to determine that it had ruptured.

Among the fusiform aneurisms 3 of the males are stated to have died of exhaustion, and 5 from excessive dyspnœa, the balance, of course, being from rupture.

When we come to the consideration of the direction in which sacculated aneurisms of the ascending arch most commonly rupture, or, in other words, when we study the neighboring tissues into which the blood forces its way when the wall of the aneurism bursts, we find that the vast majority rupture into the pericardium. Thus out of 289 cases in which death was stated to have been due to rupture in males, 75 ruptured into the pericardium and 58 into the pulmonary artery; 23 ruptured into the right auricle, 3 of these taking place some time before death; 23 ruptured externally; 14 ruptured into the superior vena cava; 11 into the œsophagus; 9 into the left auricle; 8 into the right ventricle; 8 into the trachea; 6 into the left ventricle; 6 into the left pleura, and 5 into the right lung; 3 burst in the posterior mediastinum, and 1 burst simultaneously into the trachea and œsophagus; in 20 others no statement was made as to the direction of the rupture.

There are a number of interesting facts in connection with the points which we have named. Among these it is stated that 35 of the 71 cases which ruptured into the pericardium were aneurisms of the dissecting variety, and that one of them had an ulcer on an aortic leaflet; but still more interesting is the fact that 1 of the 58 cases which ruptured into the pulmonary artery lived for four months after the rupture took place; another lived for two months, that another lived three hours, and that two lived "several" hours, showing that the false cir-

culation was established without sufficient disorder to the general circulation to produce death, and that the inflammatory adhesion of the aneurismal sac to the pulmonary artery was sufficiently strong to retain the blood in the circulatory system. Of the 23 cases which ruptured into the right auricle we also find that the rupture occurred in 3 of these some time before death took place, and that in 3 of the cases which ruptured into the right ventricle death was gradual. In 1 of the cases which ruptured into the left auricle the statement is made that death resulted not from the hemorrhage directly but from anæmia of the vital centres, due to the diverted blood-stream.

In the cases which ruptured into the superior vena cava death occurred in 2 instances slowly, and in 3 of those which ruptured externally the oozing was gradual before death occurrred.

Among the females suffering from sacculated aneurism of the ascending arch we find again that the most frequent direction of rupture was into the pericardium. Thus out of 37 cases 24 ruptured into this sac; 5 ruptured externally; 3 burst into the pulmonary artery; 2 into the right ventricle; 1 into the pleura; 1 into the lungs, and still another into a tubercular cavity of the lung; 15 of the 24 cases which ruptured into the pericardium are described as dissecting aneurisms.

In regard to the condition of the aorta in these various cases of rupture in the two sexes, we find the following information: the blood-vessel wall, aside from the aneurismal sac itself, is described in males as being healthy in 11 instances, as atheromatous in 77 instances, and no statement is made as to the condition of this vessel in 378.

Among the females the aorta is described as healthy in 3, atheromatous in 13, and no statement is made in regard to 62 of them.

Of the fusiform aneurisms, we find that but 2 ruptured into the pericardium, 4 into the trachea, 3 into the pulmonary artery, 2 into the œsophagus, and in 2 others no statement is made as to the direction of the rupture. In these cases the aorta is described as healthy in 8, atheromatous in 8, and no statement is made in regard to 18 of them.

As secondary changes in the heart itself very frequently result in cases of aneurism, we have examined into this question with some interest. Among the males we find that the heart is described as healthy in 58 instances and as hypertrophied in 29. In 16 cases the left ventricle is described as hypertrophied, and the aortic valves thickened and incompetent. In 8 other cases the aortic valves are described as thickened, in 10 as incompetent, and in 4 as thickened and incompetent, without there being associated ventricular hypertrophy. In these 4 cases the mitral valves were described as atheromatous; 1 case is stated to have had a dilated left ventricle, with deposits on the aortic valves, 1 had mitral stenosis, 1 suffered from a small left ventricle, but had a very large right ventricle. In 1 hypertrophy and dilatation of

the heart were present, and the aortic valves were destroyed by pressure, and in 1 other cauliflower growths were found on the aortic valves, and these are supposed to have caused the ulceration, and hence the aneurism. In the remaining 313 cases the condition of the heart and valves was not given.

Among the females the aortic valves were reported as being thickened in 6, incompetent in 3, and diseased in 2. The heart is stated to have been healthy in 5. Hydropericardium was present in 1 case, pericardial adhesions in 1 other, and hypertrophy of the heart in 2 other cases. In 58 no statement was made.

In the fusiform aneurisms of this portion of the arch the heart is described as being healthy in 2, dilated in 4, and hypertrophied in 3. Pericardial adhesions were found in 2 instances, and the aortic valves were thickened and atheromatous in 6 instances.

In regard to the pressure-symptoms produced by aneurisms of the ascending portion of the arch, we find that out of 80 cases in which the statement is made in regard to pressure-symptoms, 27 suffered from lividity and œdema of the face, 24 from dyspnœa and pain, 10 from œdema and pain in the neck and arms, 8 from aphonia, 6 from orthopnœa, 3 from vomiting, and 2 from pulmonary œdema.

Among the females lividity and œdema of the face were present in 4 instances, pain and cough in 3, and dyspnœa and cough in 4. Among 12 cases of fusiform aneurism, in which information in regard to pressure-symptoms is given, we find that 5 suffered from general œdema, 2 from general œdema and orthopnœa, 2 from dyspnœa, 2 from pain and aphonia, 2 others from dyspnœa and aphonia, and 1 from dyspnœa, œdema, vomiting, and syncope.

In regard to special symptoms produced by pressure, the following interesting facts were developed concerning inequality of the pulse and pupils:

Among the sacculated aneurisms we find 8 in which it is stated that the right pulse was greater than the left; the left pulse was greater than the right in 4 instances, and in 1 case the left pulse was absent in the axillary, brachial, radial, and carotid arteries. The left pupil was larger than the right in 4 cases, but in 419 cases no statement as to the condition of the pulse and pupils was made either in the male or female sexes.

Information in regard to these points in connection with fusiform aneurism was not obtainable.

Closely connected with this question of pressure-symptoms is the statements which are made in regard to the direction in which the aneurisms develop. In 21 it is stated to have projected downward, in 5 upward, in 17 forward, and in 13 backward; backward and to the left in 3, backward and to the right in 5, to the left alone in 4, and it

is a noteworty fact that it extended to the right in no less than 60. This direction is that which we would expect from the impact of blood against the aortic wall.

The pressure-symptoms which we have described so far are those which were noted during life. The result of autopsy showed that the growth had pressed upon neighboring organs as follows: In 29 instances the trachea was compressed; in 21 the left lung was disintegrated from pressure on the left bronchus, and in 1 of these the left vagus was "greatly strained." In 17 the aneurism compressed the superior vena cava; in 14 it compressed the pulmonary artery; in 6 the right lung; in 8 it eroded the vertebræ, and in 6 it eroded the ribs and part of the sternum; in 2 others erosion of the clavicle, sternum, and ribs occurred; in 2 the left vagus is stated to have been compressed, but the recurrent laryngeal nerve escaped. In 2 cases the left bronchus was ulcerated and the vertebræ eroded; in 3 the diaphragm was pushed upward, and 1 of these also eroded the vertebræ; in 2 others the right auricle was compressed, and in 1 the innominate artery.

In 6 the lungs were consolidated by pressure.

Among the fusiform aneurisms it was found post-mortem that 3 compressed the superior vena cava; 1 produced pulmonary apoplexy; another pulmonary congestion; the third compressed the trachea and laryngeal nerve, and 2 compressed the trachea alone.

It is much to be regretted that the reporters of these cases of aneurisms have not given us further information in regard to the pressure-symptoms during life, and of the conditions produced by pressure which are found at autopsy. If we did not know that pressure-symptoms were so commonly met with in aneurisms we might be led to suppose from these statistics that they are rare complications of the lesion.

A study of the occupations of these cases of aneurism which we have just described fails to reveal that any particular one can be considered as distinctly provocative of the condition, save that the disease occurred most frequently in soldiers, in whom it is said to have occurred in 11 instances, in sailors in 9 instances, in porters in 10 instances, in laborers in 6 instances, and in coachmen in 5 instances. Almost every other occupation known provides from one to three cases.

It seems to us that this is rather an interesting fact, as we would have supposed that certain occupations would far exceed all others in the frequency with which they aid in producing this condition of the ascending portion of the arch.

The Second or Transverse Portion of the Arch. When we come to the consideration of aneurisms involving the second or transverse portion of the arch of the aorta we find once again that the most common age for the development of this lesion is between thirty-five and forty-five, for out of 88 males suffering from this lesion 37 were

between these ages, 21 between forty-five and fifty five, 14 between twenty-five and thirty-five, 10 between fifty-five and seventy, and 2 between fifteen and twenty-five.

In 66 of the cases no statement was made as to whether the patient was healthy or not; 8 of them were stated to be healthy; 7 cases were stated to be due to trauma, 5 to syphilis, 2 to alcoholism, and none were attributed to rheumatism; 16 cases occurred in females, and here again the greater number were between thirty-five and forty-five, namely 8; 4 between forty-five and fifty-five, 2 between fifty-five and seventy, 1 between twenty-five and thirty-five, and 1 between fifteen and twenty-five.

Of the causative factors producing the lesion, 1 is attributed to syphilis and 2 to alcohol; in the remainder no cause was given.

When we come to consider the cause of death other than rupture we find in 88 males that 1 died of pericarditis, 2 of suffocation, 1 from collapse, 8 from exhaustion, 1 from œdema of the larynx, and 1 from pneumonia.

Among the females 1 died of paroxysmal dyspnœa, 4 from exhaustion, and 1 from pressure on the trachea.

In 37 of the males a statement is made as to the surrounding organs into which the aneurism burst; 7 of these burst into the œsophagus, 7 into the left bronchus, 7 into the trachea, 4 into the left lung, 4 into the left pleura, 4 into the pulmonary artery, and 2 into the right pleura.

Among the females 2 burst into the trachea and 2 into the pericardium.

The directions of the aneurismal growth was in 21 cases backward and to the right, and in only 2 upward and to the left; in 2 others it was directly backward; in 15 it was directed upward and to the right, and in 2 others upward and backward. The condition of the aorta in males was described as being healthy in 5 instances, and as atheromatous in 38; in 45 cases no statement as to the condition of this vessel was found.

Among the females the texture of the vessel-wall is stated to have been healthy in 1 instance, atheromatous in 6, and in 9 others no statement was given.

In regard to the condition of the heart, we find among the males a comparatively small number of cases in which a careful description of this organ is given. In 62 out of 88 instances no statement is made. It is, however, a rather noteworthy fact, that out of the remaining cases the great majority are stated to be healthy; thus 16 of the cases were said to have a healthy heart and valve; in 2 the left ventricle was dilated and the right ventricle hypertrophied; in 3 others the aortic valves were incompetent, in one of these the valves were also thickened; in still another case the aortic valves were competent but thickened; in 2

others they were said to be atheromatous, and in another to be covered with fine granules.

Among the females it is stated that in 6 instances the heart and valves were healthy.

It is interesting to note whether the symptoms produced by pressure in aneurisms of the second portion of the arch are similar to those produced by pressure by aneurisms at the beginning of the arch.

An analysis of the cases involving this portion shows that inequality of the pulse and of the pupils is mentioned in very few instances. Among the males it is stated in 2 cases that the left pulse was absent; in 13 that it was weaker than the right; in 6 a definite statement is made that the pulses were equal, and in 67 no statement in regard to this point is vouchsafed.

No statement in regard to variations of pulse and pupil is made in the 16 females.

Of the other pressure-symptoms we find among the males that dysphagia was present in 4 cases, pain in only 1, hoarseness in 1, aphonia in 1, shrill voice in 1, and œdema of the arm and forearm in 1; in still another, attacks of syncope occurred in which the carotids ceased to beat.

Among the females 4 suffered from dysphagia, 1 from paroxysmal dyspnœa, and 1 from constant dyspnœa; in other words, in only 16 cases are ante-mortem signs of pressure recorded.

At the autopsy we find that the tracheal rings were eroded in 6 cases; the left innominate vein stretched in 4 cases, in 1 of which it was obliterated; in 4 others the superior vena cava was compressed; in 1 the inferior vena cava was compressed, and the pneumogastric and recurrent laryngeal nerve were also involved by the pressure. In 2 cases both the trachea and ribs were eroded; the left carotid and innominate arteries were compressed in 3 cases; the vertebræ were eroded in 3; the œsophagus compressed in 4; the ribs and the vertebræ both eroded in 4; the right lung compressed in 2, and the ribs and sternum eroded in 2 instances. In one the left vagus and left recurrent laryngeal nerve were compressed and the left brachial cephalic vein obliterated; in another empyema is said to have arisen from pressure, and in the third the phrenic nerve was destroyed for the space of 3 inches by the pressure of the aneurism; 2 cases flattened the left bronchus, in 3 collapse of the left lung, and a number of other single ones are recorded as having compressed the trachea and left bronchus; another as causing adherent pericardium, and the third as projecting into the second intercostal space.

Among the females 4 eroded the vertebræ, 3 compressed the œsophagus, 2 eroded the ribs, 1 pressed down the right lung and was adherent to the ribs, which it slightly eroded, and another compressed the left bronchus and trachea.

It will be seen, therefore, that aneurism of this portion of the arch produces pressure-conditions which are not very characteristic, since a very large number of parts are often pressed upon.

The Third or Descending Portion of the Arch. We have collected 110 instances in which the third or descending portion of the arch was affected by the aneurism. Here, again, the frequency of the malady between the ages of thirty-five and forty-five years is striking in contrast with its frequency at other ages. Thus among 93 males so affected but 2 were between fifteen and twenty-five years, 20 between twenty-five and thirty-five years, 41 between thirty-five and forty-five years, 12 between forty-five and fifty-five years, and 11 between fifty-five and seventy years. Among the females a somewhat similar frequency also exists, although the small number of cases hardly justifies the comparison, there being but 17; of these 2 suffered from aneurism between fifteen and twenty-five, 4 between twenty-five and thirty-five, 5 between thirty-five and forty-five, and 4 between forty-five and fifty-five years.

In regard to the causes ascribed, we find among the males trauma is held responsible 15 times, alcohol 13 times, syphilis but twice, syphilis and alcohol once, and rheumatism once; in 6 instances the patient was said to be healthy. Among the females trauma is given as a cause in 5 and syphilis and alcohol in 2 cases.

In 64 of the cases occurring in males a statement as to the seat of rupture is given; in 19 instances the aneurism ruptured into the œsophagus and in 17 into the left pleura; 10 ruptured into the right pleura, 8 into the left bronchus, 3 are said to have burst into the lungs, 2 into the pulmonary artery, and 2 into the left lung. Among the females rupture took place six times into the œsophagus, twice into the left bronchus, and twice into the left pleura; once the aneurism ruptured into the vena cava superior. The frequency with which rupture took place into the œsophagus in these cases is of interest, and the rupture into the left portion of the chest is to be expected from the seat of the growth.

Among the causes of death which are given in connection with these cases of aneurism involving the third portion of the aortic arch we find that very little information is available, for in only 17 of the cases are any facts stated of this character; out of these 17, however, 9 died from pressure upon the trachea, 5 from exhaustion, 2 from pressure on the bronchus, 1 from pulmonary apoplexy, and the direction in which the aneurism extended is stated in but 24 cases; in 11 of these it extended backward, in 6 to the left, in 2 to the right, upward in 2, in 2 forward, and in 1 to the right and backward.

In regard to the condition of the heart and its valves, we find that

statements concerning this organ are made in connection with only 20 cases. Among the males in 15 of these the heart was normal, and in 5 it was dilated, hypertrophied, and the valves diseased. In the 6 females about whom information is given as to the condition of the heart, this organ is said to be healthy in 4, to be suffering from mitral stenosis in 1, and to be hypertrophied and dilated in 1. In only 23 instances was the condition of the aorta noted among males; in 20 of these it was atheromatous, and in the remaining 3 it was stated to be healthy. In females, of 17 cases in 9 it was found atheromatous.

In regard to pressure-symptoms which were produced by this growth, we find that again much information cannot be obtained from statistics, owing to the imperfect reports. In only 2 was the right pupil contracted, in 1 the left pupil was dilated, in 2 the left pulse was absent, and in 2 it was weaker.

From the anatomical position of this lesion we would not expect that there would be much variation in the character of the pulse except indirectly by pressure—that is to say, the aneurismal sac would not be in such a position as to interfere with the flow of blood into the vessels which are given off from the upper portion of the arch.

In regard to other pressure-symptoms, pain, cough, and dyspnœa were most commonly present, although they are stated to have been so in only 10 instances; in 3 there was a stridulous voice, in 8 dysphagia, and in 2 complete aphonia. So far as pressure-changes found post-mortem are concerned, there was no great constancy. In 8 the ribs and vertebræ were eroded, in 2 the trachea was flattened by pressure; in 2 others the aneurismal sac had eroded the vertebræ and compressed the recurrent laryngeal nerve; but it is a noteworthy fact that these pressure-symptoms found post-mortem were not as frequent as in other lesions of the heart, probably because of its situation.

There still remain 169 cases of aneurism of the arch of the aorta which we have been unable to classify into the three divisions named, because the reporter did not state the exact portion of the arch which was involved; of these 169 cases 124 occurred in males, and once again it is a noteworthy fact that the age, from thirty-five to forty-five, was one which was most commonly affected; thus between fifteen and twenty-five years of age there were but 2 cases; between twenty-five and thirty-five, 16 cases; between thirty-five and forty-five, 46 cases; between forty-five and fifty-five, 40 cases, and between fifty-five and seventy, 14 cases; in 6 cases the age was unknown.

Among the females this proportion was not so closely adhered to; there were 45 such cases; 2 occurred between fifteen and twenty-five, 11 between twenty-five and thirty-five, 6 between thirty-five and forty-

five, 17 between forty-five and fifty-five, and 9 between fifty-five and seventy years.

In regard to the cause, we find that alcohol and trauma seem still to be the most common cause in the minds of the physicians who reported the cases. Thus although in 93 out of the 124 no cause was given, in the remaining cases we find that 11 were due to alcohol, 11 to trauma, 1 to syphilis, and 2 to syphilis and alcohol, while 6 others are stated to have been healthy, and among the females 5 were said to be due to trauma, 2 to syphilis, and 1 to rheumatism.

In 61 cases among the males a record is made of the part involved by the rupture; in 12 instances it ruptured into the œsophagus, in 12 into the trachea, in 6 into the lungs, in 6 into the pericardium, in 5 into the right pleura, in 5 into the left bronchus, in 4 into the pulmonary artery, in 1 instance its rupture taking place two weeks before death, in 2 it ruptured externally, in 1 into the superior vena cava, in 2 into the right lung, in 1 into the subdiaphragmatic tissues, and in 1 into the anterior mediastinum.

Among the females we have information in regard to only 17 cases; 4 of these ruptured into the pericardium, 4 externally, 2 into the pleura, 2 into the lungs, 2 into the left bronchus, 1 into the anterior mediastinum, and in 2 it is stated that the area of rupture was unknown.

Among the causes of death other than rupture we find pressure on the trachea caused death in 17 instances, exhaustion in 4, serous effusion into the pleura in 2, and pressure on the superior vena cava in 1. The causes of death among the females are stated in but few instances, chiefly dependent upon exhaustion, "suffocation," and pressure upon the trachea.

In concluding this paper, we may be permitted to call attention to several facts which we think are noteworthy: The first is the far greater frequency of this lesion in males than in females; second, the far greater frequency in involvement of the ascending portion of the arch than of the other portions; third, the fact that aneurism of the transverse and descending portion of the arch seems to be about equally frequent; fourth, that in a large proportion of cases death did not ensue from rupture but from pressure by the growth; fifth, that syphilis does not seem to play as large a part as an etiological factor as is usually supposed, although this evidence is negative rather than positive, since it is possible that many of the cases which were assigned to trauma as the cause are really dependent upon syphilis, in that this disease had primarily weakened the aortic wall so that injury readily brought about aneurism.

REPORT OF A CASE OF HODGKIN'S DISEASE, SHOWING LONG PERIODS OF FEVER.

By Cunningham Wilson, M.D.,
BIRMINGHAM, ALA.

PATHOLOGICAL REPORT,

By Simon Flexner, M.D.,
PROFESSOR OF PATHOLOGICAL ANATOMY, JOHNS HOPKINS UNIVERSITY, BALTIMORE, MD.

Fever in Hodgkin's disease is one of the most common symptoms, but it is, however, rare for patients to present the long periods of fever shown in the report below. The temperature in this case ran for some time a course which resembled closely the chart of a typhoid patient, and only at times was there an intermittent or malarial-like temperature.

The charts presented by most writers show fever running from ten to fourteen days.

J. E., aged thirty-eight years, single, white, born in Alabama. *Family History.* Father living and well; mother living, but health poor; one sister living; one brother died of typhoid fever. *Personal History.* Had always had good health until his present illness. In 1892 he noticed enlargement of the cervical glands on the left side; this was soon followed by fever and loss of strength and flesh. The glands enlarged rapidly, causing him great inconvenience in swallowing and breathing. He spent the winter of 1893–94 in Florida, and was very much benefited. His fever soon left him, and the glands were reduced in size. Returning to his home his old symptoms soon reappeared, and he again lost strength. The next winter (1894–95) he spent in Florida, but gained less benefit than before. He recovered considerable strength, and the glands in his neck again subsided. During the following summer he had occasional periods of fever, but with less enlargement of the glands. He said he passed blood with his urine occasionally. His appetite and digestion were good at all times; had had no palpitation or shortness of breath; during the periods of fever he had intense headache.

On March 31, 1896, I saw him for the first time. He had been having fever for about two weeks, the temperature ranging from 99° to 103° F.; he was greatly emaciated; had severe headache, and his mind was a little confused; he had a good color and appetite, and his digestion was good. There were three or four glands on the left side of the neck as large as almonds, and two on the right side; there was no enlargement of the axillary or inguinal glands. Examination of the heart and lungs was negative. He exhibited slight tenderness over the liver; the spleen was palpable, extending two inches below the costal margin. He had no leucocytosis. The urine was normal; the temperature 103° F.; the pulse 74.

His fever continued through April, never touching the normal point until May 1, 1896. He was made much more comfortable by cold

sponge-baths. His digestion had been good, and he was allowed a liberal diet. After his fever disappeared he showed considerable prostration, but soon began to improve, and gained much flesh and strength. May 19th showed the next rise in temperature. From this time the temperature was charted, except during the periods when the patient had no fever. His digestion was now poor. June 1, 1896, there was noticed a slight bronzing of the skin of the forehead, and to a less extent on the chest and abdomen. The temperature did not touch the normal point from June 1st to July 2d, as shown by the chart. From July 2d to July 20th his temperature occasionally reached 103.5° F., when it again dropped to normal. At this time there was a little effusion in the abdominal cavity. August 3d his abdomen was tightly distended with fluid; this was tapped and about one gallon of milky fluid was removed. August 13th the abdomen was again full and about the same quantity of fluid was removed. August 25th the patient was anxious to be tapped again, as the abdomen was very full; but at this time he began to pass large quantities of urine, which kept up during the next three days, and all the fluid in the abdomen disappeared. His fever subsided and did not again reappear until September 30th. From this time it kept up, as shown by the chart, until November 27th. November 15th there was again slight distention of the abdomen; he was tapped November 19th. After this he failed slowly, and died December 4, 1896. Only a partial autopsy was allowed.

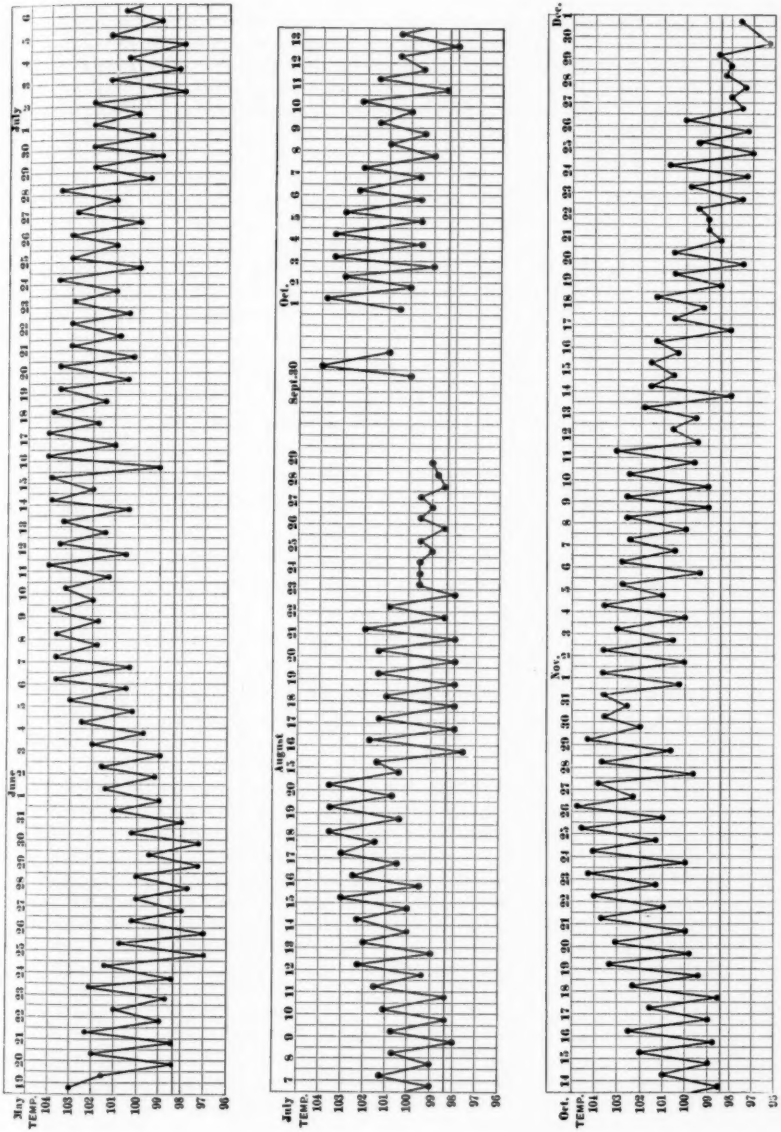
I append the report, kindly made to me by Dr. Simon Flexner, of Johns Hopkins University, of the tissues removed:

"I have made sections from several pieces of the tissues which you sent me. The spleen contains the greater amount of tumor formations. The liver showed no actual tumor nodules, but in the capillaries I detected an occasional cell like those that occur in the tumors. The type of sarcoma is not the ordinary lymphoid one; the cells are not chiefly of the lymphoid variety, but show a great variety of size and form. Some may be round; more are oval, and many have compound (multiple) nuclei. The large number of multinucleated cells is one point of difference from the usual type of lymphosarcoma, and other variations are the almost complete absence of the smaller lymphoid cells, as well as a suggestion of reticulum between the cells such as occur in lymphomata. In the spleen the nodules are very little circumscribed; they pass over into the splenic tissue more or less freely, and single cells of the kind found in the nodules occur at removed points among the normal splenic elements.

"The largest node I have seen exists in what I take to be the sheath of a large branch of the splenic vein. It passes into the organ along the cellular tissue spaces, but in the section has not invaded the vein itself.

"I have encountered two such cases during the past two years, and possibly a third one, combined with tuberculosis. I had hoped to complete their study for publication before now, but I have not yet been able to do this.

"While I have hesitated to speak of these tumors as lymphosarcoma, the clinical picture of the case is so conclusive of Hodgkin's disease that no other course seems open. If, however, such cases are to be regarded as Hodgkin's disease our conception of the pathology of the affection must be widened.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"The cases are, after all, examples of lymphosarcoma, excepting that the type of the new tissue differs much from lymphoid structures and agrees better with what is usually denominated mixed-cell sarcoma. In the review of the literature which I made four or five years ago I do not remember to have found similar cases described. I do not, however, see that any other designation than Hodgkin's disease, or one of its synonyms, is applicable to the symptom-complex of this disease, and, therefore, this name, or lymphosarcoma, must be applied to the pathological process."

A CASE OF ACUTE GANGRENOUS PANCREATITIS, WITH FAT NECROSIS.[1]

BY J. A. SCOTT, M.D.,
OF PHILADELPHIA.

SINCE the monograph of Fitz[1] on "Acute Pancreatitis" was published in 1889 considerable careful clinical observation has been made upon pancreatic diseases. During the last twelve months three important contributions have been made to the subject, and the list of reported cases considerably increased. Korte,[2] in the *Deutsche Chirurgie*, Lieferung, 45 D., has published a monograph, with special reference to the surgical aspect of pancreatic diseases. In Nothnagel's *Special Pathologie und Therapie*, Bd. xviii., Oser[3] has written a comprehensive article, with full bibliography. In January of this year Lancereaux,[4] in his treatise upon diseases of the liver and pancreas, gives a complete account of all pancreatic diseases.

I desire to report the following case of pancreatic disease because of the comparative rarity of the condition, and the presence of some rather unusual symptoms.

Mrs. A. B. G., Hospital No. 1097, aged sixty-four years, white, married, was admitted into the private ward of the Pennsylvania Hospital August 1, 1898. Her father and a sister had died with chronic renal disease. Her mother had always been healthy, and died of senility. The patient's personal history was as follows: She was an active worker in charitable and philanthropic societies; her general health had been good, but during the last ten years of her life she had been rather a frequent sufferer with gastro-intestinal attacks, which were characterized by pain and distention of the stomach. Her physician has told me that she did not seem able to digest starchy foods. These attacks would, however, pass off in a few days' time, when she would be as well as usual. In 1895–96 she had an illness, during a portion of which she was a patient at the German Hospital. This sickness was characterized by constant pricking sensations over the entire body, but especially marked about the neck, shoulder, and trunk She became

[1] Read before Medical Section, College of Physicians, May 8, 1899.

much emaciated, and did not recover until she tried a change of climate, going to Glenwood Springs, Colorado, and taking medicinal baths at that place. It seems to me that this must have been a neurosis, and had no connection with her subsequent illness. Prior to the present sickness she had been working extremely hard, her digestion had not been good, and she seemed rather mentally depressed. For a week or ten days before her sickness she was obstinately constipated, with swelling of the abdomen and some flatulence. The present attack began suddenly, about half-past eleven at night, between four and five hours after the ingestion of food. Following her supper, which she had about six o'clock, she spent the evening with some friends; shortly after going to bed she was seized with a violent pain in the pit of the stomach; the abdomen became tender and swollen; she belched large quantities of gas and vomited copiously. Her attending physician administered morphine that night, and again on the following day, and the pain was considerably allayed. The bowels, which had not been moved for six or seven days, now became loose, and were moved almost constantly, the stools being dark and rather liquid. Twenty-four hours after her illness began she became delirious, or, as her physician said, went into coma. On the fifth day of her illness she was sent to the hospital. Upon examination her condition was as follows:

She was a well-nourished woman, weighing probably 160 pounds. She was very restless, constantly shifting her position. Her temperature was 102.2°; pulse 88, soft, rather small, irregular, and intermittent; respiration 24. Her mental condition was interesting; she seemed to understand questions asked, and answered them in a coherent manner, but would then begin to talk or sing to herself. It was, therefore, not possible to assure one's self that her replies were accurate. Her condition resembled a mild mania. Her tongue was moist, with a brownish coat. There was no jaundice present; the pupils were contracted to almost pin-point size, and so continued. The heart's action was irregular and intermittent; abortive systoles were frequent. At the apex the first sound was impure; no murmur was heard. The belly was tightly distended with gas. The skin was red, evidently from counter irritation. On palpation at this time no tenderness was elicited in the epigastric region; no tumor or mass was felt. The liver and spleen were normal in percussion area. The urine, which always had to be withdrawn by catheter, was diminished in amount and continued to be so—twenty-six ounces in the first twenty-four hours; it was light-yellow, 1012, containing neither albumin nor sugar, but microscopic examination showed many hyalo-granular, dark granular, and fat casts, and a few leucocytes. At one subsequent examination there was a suspicion that sugar was present. Subsequently a trace of albumin was found, with a large number of dark granular casts. During the first twenty-four hours the bowels moved nine times; the stools were liquid, dark in color, and did not contain fat. After three days there seemed to be some improvement in her physical condition. The belly was slightly tympanitic, and she winced on palpation over the right lobe of the liver. The talkative delirium persisted, and the temperature remained 101°. The diarrhœa had now ceased, and several formed brown movements were passed. Five days after admission the belly had become soft, but the patient was stuporous, and winced when the epigastric and hepatic areas were palpated. There were a few suspicious,

lenticular, rose-colored spots on the chest and bosom. Diarrhœa again set in, the stools being dark-green, and containing a considerable amount of mucus. The patient was rapidly losing flesh and strength.

At times her pulse was almost imperceptible, and the extremities and face cyanotic. The blood examined upon this day gave a positive Widal reaction. Upon the succeeding day, or the seventh in the hospital, there was slight improvement. The abdomen was softer, and a doubtful mass, several inches in diameter, and extending across the epigastric region, was felt. Upon the subsequent day the Widal test was again positive. The patient gradually sank, and died in the early morning hours of exhaustion—the tenth day in the hospital and the fifteenth day of her illness.

The autopsy was made about six hours after death. The brain and spinal cord were not examined. The body was that of a medium-sized, fairly well-nourished woman. The skin was very pale. The right heart was full of clotted blood and the ventricle flabby. The heart was normal, except a slight thickening at the base of the mitral and aortic valves. A slight degree of hypostatic congestion was present at the base of each lung. An old puckered cicatrix, probably tuberculous, was found at the apex of the right lung. Upon opening the abdomen I was at once struck by the numerous areas of fat necrosis in the omentum, and began to investigate the pancreas. A localized peritonitis existed; the smaller bowel was here covered with lymph in the epigastric region, and was matted together by rather recent fibrinous adhesions; this made a covering for a mass which was subsequently made out to be the pancreas. There was a small amount of turbid sero-sanguinous fluid in the peritoneal cavity. Through the omentum, mesentery, and mesocolon were hundreds of necrotic areas (fat necrosis), varying in size from that of a pin-point to that of a split-pea. They were yellowish-white in color, raised above the surface, with slight inflammatory areas around them. Sometimes two such spots would be confluent. When the adherent coils of the smaller bowel were raised up there was behind them a localized collection of turbid fluid, which was bounded in front by the bowel, above by the stomach, and below by the pancreas. This was unquestionably purulent exudate into the lesser peritoneal sac. The pancreas itself was enlarged to about three times its normal size, its head projecting into the duodenum. It was soft, and was with difficulty examined, because of the adhesions, and the abscess of which it was the lower boundary.

On section of the head and body of the pancreas, they were found in some areas bright red and in others coal-black in color. The tail was less affected than the body and the head. In many areas the pancreatic tissue was entirely gangrenous. There was no obstruction or calculus in the duct. The hemorrhage into the pancreas had not been large in amount, and extravasation into the surrounding tissues had not taken place. There was no inflammation or ulceration of Peyer's patches. There was no perforation of the gut. The appendix was normal. The spleen was small, soft, pliable, and intensely congested. The liver was large and fatty. The gall-bladder contained three facetted gallstones, one the size of a hickory-nut. The kidneys were fatty and contracted, the left containing a cyst the size of a large hen's egg, filled with a yellowish, slightly turbid fluid; the capsules stripped easily.

I had not, at the time of the patient's death, made a diagnosis in her case. I could see nothing upon which to base a definite opinion. The symptoms, now clear to me, were then obscured by the mental condition, and the results of the blood and urinary examination. I felt sure she had not typhoid fever; also positive that she was not uræmic, though appreciating that the kidneys were by no means normal. I was inclined to think that she had had previous intestinal obstruction, and that partial relief of the obstruction had taken place, and that we were dealing with a disappearing local peritonitis. The question of pancreatic disease was discussed, and the stools were watched, but nothing was gained from this. No tests for suppression of the pancreatic secretion were used. I could not entirely account for the unusual mental condition, and felt certain that the patient had an illness of a grave character.

Cases of acute pancreatitis are comparatively rare. Of the hemorrhagic variety Korte has collected 41, only 4 of these occurring in women. The hemorrhagic cases may be followed by suppuration of the gland—acute suppurative pancreatitis. Fitz, in his monograph in 1889, reported 22 cases, and to this list Korte has added 24. Gangrene or necrosis may follow either inflammation, hemorrhage, or suppuration of the gland. Of acute gangrenous pancreatitis Fitz has reported 15 cases, and Korte has increased this number to 40. I have gone over the records of the Pennsylvania Hospital for the past ten years (1888 to 1898), and, barring cases of primary cancer of the pancreas, of which there are a few, found no cases of acute pancreatitis recorded. There was one case (Hospital No. 1353, 1897) of pancreatic cyst in a woman, who was operated on by Dr. Thomas G. Morton. The fluid secured was yellowish; it converted starch into sugar and emulsified fat. This patient recovered. I have gone over the records of the post-mortem room since authentic records have been kept (1876), and have found, excluding cancer of the pancreas, but one additional case of acute pancreatic disease. I will give a brief history of this case:

A. F., male, aged thirty-four years, Hospital No. 714, admitted July, 1894. The patient was a rather stout young German, who used alcohol freely. Two days before admission to the hospital he complained of abdominal pain. The bowels had been moved four times on each of the previous two days. Upon admission to the hospital the man was dull; the temperature was 102.4°. It dropped the following morning to 99°, and then to normal. There was an increase of resistance, with dulness on the right side of the abdomen and tympany on the left. No mass was made out. After admission to the hospital the bowels were constipated; he vomited and retched considerably. A movement was effected with castor-oil. The urine was 1018, and contained no albumin or sugar. The man was evidently very ill, and on the third day he died, his temperature rising to 102° before death. The post-mortem showed a wide-spread fat necrosis, with the following changes in the

pancreas: A hemorrhage into the gland, almost doubling its size; the pancreas was dark red in color and necrotic in areas. The changes in the gland were most marked in the head and body; the tail was but little affected. No marked pathological changes were found in the other organs.

On the other hand, however, acute pancreatitis seems to be becoming more clearly recognized or more prevalent. On December 8, 1898, before the Clinical Society of London,[5] there were reported seven cases of acute pancreatitis, and two cases of pancreatic calculi. Two other cases were also mentioned during the discussion. I know that within the last two years Dr. William Pepper had seen and diagnosed two cases of acute pancreatic disease, both of them being associated with pre-existing liver disease. I believe these cases will subsequently be reported. I have found in the report of the Presbyterian Hospital for 1898 one case of acute hemorrhagic pancreatitis. I do not find, however, that the question of acute pancreatic disease has been presented in the last decade to the College of Physicians or to the Pathological Society, though prior to 1890 Drs. Pepper, Osler and Hughes, Formad, Musser, and Starr have made contributions on that topic.

The disease is not commonly diagnosed. Dr. Osler in his last edition states that Fitz and Thayer have made the diagnosis intra vitam. I have seen the diagnosis of hemorrhagic pancreatitis made upon the operating table because of the presence of multiple areas of fat necrosis in the omentum (a case quoted by Osler), but the patient recovered, and was living four years later, when he had a recurrence. At the present time, however, cases of acute hemorrhagic pancreatitis have been sufficiently studied to enable us to form a fairly good clinical picture of the symptoms. Such cases usually occur in persons over fifty years of age, who are heavy-weights, and especially those who have used alcohol to excess.[6] The major portion of these cases have occurred in males, many of whom had a previous history of gastric and intestinal upsets. The illness begins suddenly, with severe colicky pain in the epigastric region, the symptoms usually appearing shortly after the ingestion of food, or at the beginning of the digestive process.[7] The pain does not radiate toward the left shoulder (Lancereaux); vomiting follows almost immediately. The vomited material may be copious, cosisting of partially digested food or slimy matter. It may become green or black, and sometimes contains a little liquid or clotted blood.[8] According to Lancereaux, the vomit is bilious and usually acid. Symptoms of collapse soon follow. There may be some tenderness or increased resistance over the pancreatic area. Fitz considers the presence of localized spots of tenderness over the abdomen of great diagnostic value. They are probably due to areas of fat necrosis. The temperature for the first twenty-four hours is normal or subnormal, but

apt to rise after this to 100° or even to 104°. The belly usually becomes distended. The bowels are generally constipated, sometimes with alternating diarrhœa. The urine, which may be very abundant at the beginning of the attack, becomes much reduced in quantity. It may contain albumin and casts; sugar has been found. A mild delirium is sometimes present. A severe case usually terminates at the end of the third or fourth day in death. It is thus seen that these cases are similar to those of poisoning by irritant chemicals. Lancereaux cites the case of a large, fleshy woman, in whom death was preceded by convulsive movements, and in which the course was so rapid that he thought the case might have been poisoning by cyanide of potassium. Zenker compares the onset to the symptoms which follow a blow upon the pit of the stomach.

If, however, the case does not terminate fatally within the first three or four days we may be dealing with another form of pancreatic disease—namely, either the suppurative or the gangrenous. The symptoms then become those of a localized peritonitis; the belly becomes more tympanitic, the temperature slightly irregular, and the bowels may now become diarrhœic. A mild delirium is usually present. The urine is usually albuminous and lessened in quantity. Sugar has been found, and if the infection has taken place through the pancreatic ducts, and not through the blood (an important distinction according to Lancereaux), sugar is usually present. Emaciation begins and may become extreme. The abdomen may soften enough to reveal a mass on palpation in the epigastric region. Hiccough may be present, and not infrequently the patient is jaundiced. The stools, if examined, may show the presence of fat, and, if meat diet is used, an excess of undigested muscle fibre.[9] Fat may also be present in the urine (lipuria), and indican is sometimes found.

If gangrene follows acute pancreatitis, more or less of the entire gland is transformed into a gray mass with a tendency to become spongy, and to form a slough, which in some cases is attached to the abdominal wall by only a few shreds of tissue. The omental bursa (the lesser sac of the peritoneum) is not infrequently the seat of blood-stained fluid, or a large cyst in which masses of necrotic fat may be found (Fitz).

The post-mortem findings, therefore, in these cases are in brief as follows:

If hemorrhage has taken place the pancreas may be enlarged to two or three times its normal size with hemorrhagic infiltration. The blood is sometimes infiltrated into the surrounding tissues, or but a portion of the gland, usually the head or body, is involved in the hemorrhagic process. The pancreatic tissue is in areas bright red, in others black, dependent upon the duration of the hemorrhage. The cause of the

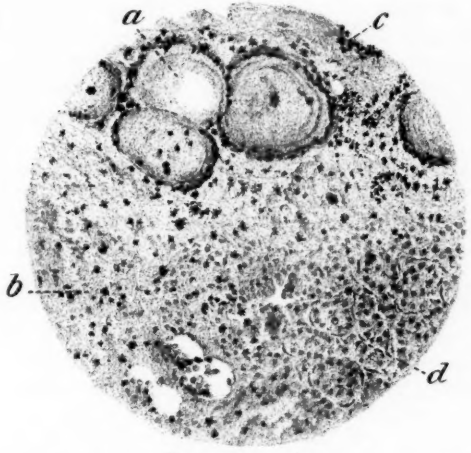
hemorrhage is as yet in doubt. Fitz has not been able to discover, after careful examinations, the rupture of any bloodvessel in the gland. Lancereaux believes, however, that the bleeding takes place from miliary aneurisms, such as are frequently found in the brain and lungs of tubercular or syphilitic patients, and that have been overlooked in the examination of the pancreas Warthin,[10] who has recently studied the minute pathology of acute pancreatic disease, finds all the bloodvessels, especially the veins and capillaries, much degenerated, and considers that the hemorrhage is due to a diapedesis. The severity of the symptoms produced (pain, colic, etc.) is probably the result of pressure upon the solar plexus. The microscopical examination of these nerves has shown distinct degenerative changes. Attending this state of the pancreas, and in the inflammatory conditions, subperitoneal areas of fat necrosis, varying from the size of a pin-head to that of a pea, are always found in the omentum, mesocolon, and mesentery. This necrosis may be so excessive as to be found in the perinephritic and pericardial fat (Warthin).

Fat necrosis is always observed in the pancreas. This fat necrosis (so called by Balser) we find in this and in no other condition, though Osler states that it has been accidentally found in operations for ovarian tumors, and in lean people who have gallstones. The fat necrosis, which is so widely scattered, is generally supposed to be due to the action of the fat-splitting ferments which have been found in the necrotic areas by Flexner. Experimentally, Williams, Hildebrand, Flexner, and Hlawa have reproduced the hemorrhage and fat necrosis —Flexner by the injection of acid and alkali solution into the veins of guinea-pigs. His conclusions were that the necrosis was not produced by the acid solution used. Carnot[11] has repeated these experiments with papain and diphtheria antitoxin, and secured results identical with the above. Warthin, because of the wide-spread necrosis, the fact that bloodvessel degeneration is extreme, and that degenerated red cells and thrombi are numerous, is inclined to think the necrosis is caused by an active hæmolytic poison, the result of disturbed metabolism.

I will not enter into the minute pathology of the fat necrosis. The two illustrations which accompany the article show well the necrotic areas as they occur in both the pancreas and the omentum. The blood crystals from the hemorrhage into the pancreas show especially well, though they are of rather an unusual form, spiculated. These specimens were from sections made in the second case detailed above, and prepared at the Pennsylvania Hospital by Dr. Thomas S. Kirkbride, who kindly loaned them to me for study. The pancreatic specimen also shows, in several places, areas in which there appeared to be rather numerous bacteria, but which, upon closer inspection, are unquestion-

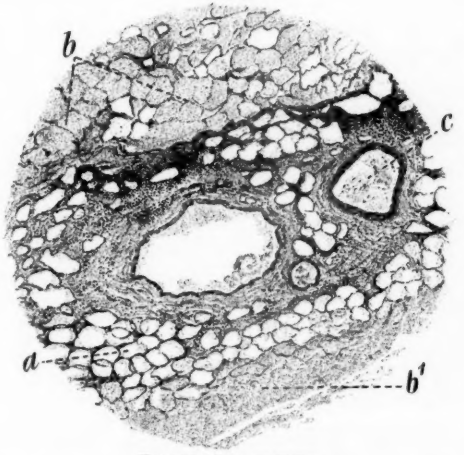
ably fat crystals, the products of the fatty acids. I regret that I have not been able to illustrate this point.

FIG. 1.



Pancreatic necrosis.
a. Necrotic fat. *b*. Tissue necrosis. *c*. Hæmatoidin crystals in spicule form. *d*. Acini undergoing necrosis.

FIG. 2.



Fat necrosis in omentum.
a. Normal fat. *b*. Necrotic fat. *b*1. Total tissue necrosis. *c*. Artery with thrombus.

If the inflammatory process goes on to suppuration, abscess, either single or multiple, is found in the pancreas.

If gangrene of the gland occurs the pancreas becomes mushy, grayish-black, may break down altogether, and is usually the boundary of a cystic collection of fluid in the lesser peritoneal sac. Fat necrosis is found in these two conditions. If a cyst forms in the lesser peritoneal sac the case may be one of many months' duration, for the cyst may become enormous. Upon examination of the abdomen it is usually found between the stomach and the transverse colon. A very good description of these cystic formations is to be found in Korte's work.

It can, therefore, be seen from the above statements that the diagnosis of acute pancreatitis is not made with ease. It is to be differentiated from, first, acute intestinal obstruction; second, perforating gastric or duodenal ulcer; third, hepatic colic; fourth, an irritant poisoning; and, fifth, thrombosis of the mesenteric vessels.

A careful investigation into the character of the patient's previous health will always be of great assistance in the diagnosis. It is not necessary for me to enter into detail. Acute hemorrhagic pancreatitis is differentiated from acute intestinal obstruction by the severity of the onset, by the absence in the early stages of distention of the abdomen, by the tenderness in the region of the pancreas, and by the infrequency of the obstruction of the bowel in the epigastric region.

It is differentiated from ulcer of the stomach by the absence of pain immediately after eating and the absence of blood from the vomit and stool; from gallstone by the seat of pain and tenderness, and the absence of previous attacks of hepatic colic and jaundice; from irritant poison by the absence of the history of ingestion and the examination of the vomit.

Thrombosis of the mesenteric vessels is rare. In the majority of cases the heart or abdominal aorta is diseased; there is usually incessant vomiting and diarrhœa, with rapid abdominal distention.

The prognosis of these cases is usually extremely grave; the majority of them have resulted fatally. There have been reported four or five recoveries after operation—one by Osler, before mentioned, one by Korte, one by Thayer, one by J. Langton, and one by Manges.[12] Manges' case illustrates very well the onset of pain after the ingestion of food, and shows that an exploratory laparotomy alone is of such assistance that recovery may take place. Troyfoyer's well-known case was living seventeen years after the pancreas had been passed by the bowel.

The best treatment, therefore, for acute pancreatitis consists in making a correct diagnosis and handing the patient over to the care of the surgeon. I believe the next few years will present more correct diagnoses, with a better percentage of recoveries from operation.[13]

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THE DIAGNOSTIC VALUE OF THE WINTRICH TRACHEAL SOUND.

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MODERATE percussion over any portion of the normal thorax gives a sound of a certain character which is not modified by the patient holding the mouth open. If at the same time the examiner percusses the thorax he place his ear near the patient's nose he will perceive no difference in the character of the sound. Under normal conditions moderate percussion-vibrations are not communicated to the large bronchi, consequently the column of air in the trachea is not implicated in the percussion, and no sound issues from the nose.

Under certain pathological conditions the vibrations of a moderate percussion stroke will be communicated to the large bronchi, thus involving the column of air in the trachea. Under such conditions there will be two sounds conducted to the examiner's ear—one directly from the thorax through the atmosphere, the other through the trachea and nares or open mouth. Wintrich described the modification of the percussion note over cavities in the lung that occurred when the patient held the mouth alternately open and closed. When the mouth was opened the percussion-note became more tympanitic and clearer and higher in pitch, because the open mouth permits the pharynx to act as a resonator over the column of air in the trachea, which is set in vibration when the percussed cavity communicates with a bronchus. Williams noticed the same modification of the percussion-note over consolidated areas of the lung at the apices and also over the upper thorax when the lung was compressed from pleurisy with effusion. In both consolidation and compression of the upper lobes of the lungs the consistency of the lung is increased, so that the vibrations from moderate

percussion are communicated to the large bronchi and trachea. The implication of the column of air in the trachea can be recognized when the patient's mouth is closed if the examiner will compare the sound as transmitted directly through the air to his ear with that heard when the ear is close to the patient's nostrils. In cases of moderate infiltration of the apices of the lung, when the characteristic Wintrich tracheal sound cannot be demonstrated by having the patient hold the mouth alternately open and closed, one may recognize a distinct difference in the sound heard at a distance and heard at the patient's nostrils. The sound heard at a distance is dull, high in pitch, and short in duration; the sound at the nostrils is tympanitic, high-pitched, and longer in duration. One can easily recognize the sound as issuing from the nares with moderate percussion.

This modification of sound is not demonstrable by light percussion over the bases of the lungs when consolidated, because of the remote position of the larger bronchi. In cases of infiltration at the base of the lung, when the thorax is percussed by striking a firm blow with the palmar surface of the ends of the metacarpal bones, the tracheal change of sound can be demonstrated, provided the bronchi are not stopped. This sign may in some instances be of service in differentiating between pulmonary consolidation and pleurisy with effusion. I have been able to demonstrate this phenomenon in several cases of miliary tuberculosis and lobar pneumonia, but never in pleurisy with effusion or hydrothorax.

When the percussion vibrations are readily communicated to the tracheal column of air, in either consolidation or cavity formation, this relation can be appreciated by the percussing finger as well as by the ear. The following experiment will illustrate this statement: Let the examiner percuss the supraclavicular space, holding his eyes closed during the experiment. The patient is instructed to hold the mouth closed, and an assistant will close the patient's nostrils from time to time while the examiner is percussing. The examiner can tell when the patient's nostrils are closed, though the sound is not modified as it reaches the ear. He recognizes the closure of the nostrils by a perceptible increase of resistance to the percussing finger. I have been able to do this successfully in cases of pneumonia at the apex as well as in cases of tubercular cavities at the apices. This experiment gives one a good conception of the accessibility of the tracheal column of air when the consistency of the intervening medium is increased.

Thus far we have dealt with the tracheal sound only as it occurs in consolidation, compression, and cavity of the lungs. In a normal adult percussion over the upper portion of the sternum will not give a tracheal sound, because the inflexibility of the sternum and the softness of the tissues intervening between the sternum and the trachea are unfavorable

for the transmission of vibrations to the trachea or bronchi. If the medium between the sternum and the trachea be increased in consistency a light percussion stroke over the manubrium will give a tracheal tone as clear as that heard over a cavity at the apex. The following case is a good illustration of this fact.

An old inmate of the infirmary was brought to the City Hospital, complaining of dyspnœa. Physical examination revealed moderate cyanosis and dyspnœa; temperature 101° F. The entire left thorax was dull, increasing to flatness over the lower portions, with great resistance to the percussing finger; respiratory excursion diminished. The palpable fremitus was diminished over the upper portions and absent over the base of the thorax. There was loud bronchial inspiration and expiration, attended with medium moist and dry râles over the upper thorax. Over the lower portions there was distant bronchial inspiration and expiration. The heart was not dislocated to the right. There was no distention of the jugular veins and no œdema of the head or neck. There was no enlargement of the palpable lymph-glands. Over the left thorax a tracheal tone was demonstrable on percussion over the supraclavicular and infraclavicular, the suprascapular and the left interscapular regions. Here were all the signs of a pleurisy with effusion, with attendant compression of the lung, and the findings made such a diagnosis necessary; but during the examination it was noticed that the tracheal sound became much more distinct as we percussed toward the median line. Though the manubrium was not markedly dull or resistant on percussion, the tracheal sound attending percussion of the manubrium was much more distinct than over the apex of the lung. On this sound alone a diagnosis of mediastinal tumor with transudation in the left pleural cavity was made. About four pints of serum were aspirated from the left pleural cavity. This did not affect the percussion-note over the manubrium; the tracheal sound remained as distinct as before the fluid was removed. Percussion in the left interscapular region gave the same tracheal sound.

The autopsy revealed a lymphosarcoma, the size of a large fist, occupying the mediastinum. Since this case was seen I have had frequent opportunities to study the tracheal sound over the apices in bilateral consolidations and in pleurisy with effusion. In no instance was there a tracheal sound produced by percussing over the manubrium, though percussion in the supraclavicular and infraclavicular spaces gave a distinct tracheal sound.

This case was seen in August, 1897. Since that time four more cases of sarcoma of the mediastinum have come under my observation. In all but one a distinct tracheal sound attended percussion over the manubrium. The one which failed to give the tracheal sound was in a child, four years old. There were in this instance several other indications of

mediastinal tumor, such as fever, dyspnœa, free fluid in the left pleural cavity, dulness over the manubrium, and enlarged lymphatic glands in the axilla. The relative position of the tumor and trachea as found at autopsy did not explain the absence of the tracheal sound. The only possible explanation to my mind is that the child instinctively closed the glottis whenever the manubrium was percussed, though the precaution was taken to percuss during inspiration.

In two of the remaining three cases there were evidences enough beside the tracheal tone to make the diagnosis. Though the autopsy in both instances revealed large lymphosarcomata filling the mediastinum, the tracheal sound could be demonstrated only during forced inspiration During expiration not the slightest suggestion of it could be elicited. During forced inspiration the Wintrich change was as clearly defined as it would be over a large cavity in the apex of the lung. The explanation for the sound being demonstrable during inspiration only may be found in the descent of the trachea and tension on the structures in the mediastinum during the act of inspiration. In this manner the tumor is possibly brought into more intimate contact with the sternum, thus favoring the production of the tracheal sound. The autopsies, however, showed the trachea to be surrounded by the neoplasms, and the neoplasms were firmly adherent to the sternum. It is very difficult to understand how the inspiratory act should be necessary for the production of the phenomenon when the relative positions of the parts as found at autopsy seem to present all the conditions required for the tracheal sound.

Aneurisms of the first portion of the arch of the aorta will give the tracheal sound as distinctly as do solid tumors. I have had the opportunity to demonstrate this sign in four cases of aneurism of the first portion of the arch. In every instance the sound could be brought out during deep inspiration only. In one case it disappeared after a few weeks' rest in bed. With the disappearance of the tracheal sound there were also modifications of other physical signs, which indicated a diminution in volume of the aneurismal sac. This patient left the hospital much improved, but died suddenly several months afterward, and was autopsied at the coroner's morgue. The examination revealed a thin-walled aneurismal sac of the ascending arch, which was not larger than a hen's egg.

Another very unique case in which the tracheal sound was of great diagnostic service was one of pericarditis with effusion, which presented considerable difficulty for differential diagnosis from pleurisy with effusion and pneumonia with mediastinitis.

By percussing lightly over the sternum at Louis' angle a distinct tracheal sound was demonstrable during forced inspiration only. The tracheal sound could be produced only by percussion over a sharply

defined area. This area extended on the sternum three-quarters of an inch above Louis' angle to three-quarters of an inch below the angle. Over the left infrascapular area of dulness, which commonly occurs in pericarditis with effusion, percussion was accompanied by a distinct tracheal tone. It was, however, unaffected by the respiratory phases. The tracheal sound in the two positions referred to were due to different causes. That brought out by percussion over the infrascapular area was due to percussion over a compressed lung, while the tracheal sound produced by percussion of the sternum was caused by the pericardial cul-de-sac (formed by the reflection of the pericardium over the large vessels at the base of the heart) being distended with fluid.

The cul-de-sac occupies the anatomical position over which the tracheal sound was produced. This sac of fluid lay between the sternum and the bifurcation of the trachea. During forced inspiration the bifurcation of the trachea would be pulled downward into more intimate contact with the pericardial sac, and thus favor the transmission of the percussion vibrations through the sac of fluid to the large bronchi. Paracentesis was made in the fifth interspace, half an inch to the right of the sternum. About eight ounces of bloody serum were withdrawn from the pericardial cavity, and directly afterward the Wintrich tracheal sound on percussion over the sternum disappeared.

The question may be raised as to whether the Wintrich or the Williams tracheal tone may not occur with percussion over the manubrium in normal cases. So far I have found only one patient in whom the tracheal sound could be elicited by moderate percussion over the manubrium, and in whom there was doubt as to the existence of a mediastinal mass. This patient complained of dyspnœa and some difficulty in swallowing. No other signs of mediastinal tumor were present. The case was lost sight of, so whether this instance is an exception to the rule or not must remain in doubt.

There are several precautions to observe in testing for the tracheal sound where mediastinal involvement is suspected. The chin should be elevated to produce as much longitudinal tension as possible on the trachea; this seems slightly to favor the sign. Then, too, if a patient is told simply to take a deep inspiration, at the height of the inspiration the glottis is instinctively closed, as in this way the thorax is maintained in the inspiratory phase with the least possible effort; and if the vocal cords are approximated all sounds from the trachea are cut off and the tracheal sound will not be audible.

The patient should be instructed to take a deep breath and continue the inspiratory effort after the thorax has reached the height of its excursion; by so doing the vocal cords are kept apart and the passage of sound and air from the trachea is not obstructed.

One should have the patient hold the mouth open, with the tongue

protruded. The examiner should percuss gently over the manubrium, and continue this throughout the act of inspiration. He should place his ear directly before the patient's mouth. When the tracheal sound is present it can be easily recognized by its characteristic metallic resonance and issuance from the mouth. The sign when present is so striking that the most inexperienced investigator could not fail to recognize it.

The tracheal sound is produced by percussion over the upper portion of the sternum whenever there is a solid or liquid mass which will communicate the percussion vibrations to the bronchi. This will occur in mediastinal tumor, aneurism of the ascending arch of the aorta, and pericarditis with effusion, provided there is a sufficient amount of fluid to distend the pericardial cul-de-sac over the origin of the large vessels at the base of the heart.

The tracheal sound from percussion of the manubrium is not present in consolidation or cavity of the upper lobes of the lungs, nor is it present in pleurisy with effusion.

In searching medical literature I can nowhere find any mention of this sign in connection with tumor of the mediastinum. It has been of considerable service to me in differential diagnosis. It should be of assistance to the surgeon in determining upon the advisability of operation on tumors of the neck

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SPLENIC PSEUDOLEUKÆMIA (ANÆMIA SPLENICA; SPLENO-MEGALIE PRIMITIVE),

WITH THE REPORT OF A CASE.[1]

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The object of this article, briefly stated, is (1) to further the recognition of a very rare and fatal disease, to which the term splenic pseudoleukæmia seems most applicable; (2) to contribute to its symptomatology and pathology; (3) to record the results of experimental research, employed with a view of determining its nature and etiology; (4) to present reasons why, in the light of our present knowledge and experience, the removal of the spleen is the treatment to be advised when the diagnosis is certain and the conditions not especially unfavorable.

Report of Case. Anton B., Russian, aged forty-five years, was referred to my clinic at the Post-graduate Medical School of Chicago by Drs. Alexander H. Ferguson and G. Burdick, on April 16, 1898.

[1] A critical summary of the literature on this disease, by the same author, will be published in a subsequent number of the Journal.

The following history was obtained: *Family History.* Mother died of old age; father died of unknown cause; no tuberculosis in the family, to his knowledge. *Personal History.* The patient has not had malaria nor has he lived in a malarial district; he has not had syphilis nor gonorrhœa; his wife had five healthy children and no miscarriages; he has not had typhoid fever or any previous illness since grown up, and never used alcoholics. He came to Chicago nine years ago, and has not lived outside the city since. Was always strong and healthy. About three and a half years ago he noticed a swelling in the left hypochondriac region. The mass was firm, but not painful on pressure or otherwise. At about the same time he also noted that he was easily fatigued. Shortly after this he complained of slight nausea, and vomited occasionally. His appetite soon became impaired, and it has not been good since. About three and a half years ago, or at about the time the swelling in the left side was first noticed, the patient had diarrhœa (three to four stools daily), which continued for nearly six months. Since then he has been rather constipated. Has had chilly sensations now and then, followed by fever; no distinct chill was ever experienced. This disturbance in temperature was not accompanied by pain, nausea, or vomiting. The patient has complained of shortness of breath from about the time the swelling was noticed, and this has gradually increased; now and then dizziness and headache have been present. Palpitation of the heart has not been noted; pain on breathing has never been present. Epistaxis began about two years ago, and since then has often been repeated; it has varied in amount from a few drops to a tablespoonful; previously the patient seldom had nose-bleed. The feet and ankles began to swell about one month ago, and since then have not been free from swelling. He has noticed a gradual growth of the tumor in the left side. The greatest local discomfort he describes as a feeling of fulness and pressure in the epigastric and left hypochondriac regions. He has never experienced pain in any portion of the abdomen. He has lost about twenty-five pounds in weight, and is not able to walk more than a very short distance without experiencing fatigue and dyspnœa.

Physical Examination. Patient rather poorly nourished; slight subicteric hue of skin and conjunctivæ. The mucous membranes show evidence of anæmia. The skin and finger-tips present the peculiar pallor of a moderately profound anæmia. Ears and nasal cavities negative; mouth and pharynx negative; tonsils normal size; glands at base of tongue not enlarged; laryngoscopic examination negative. The bloodvessels of the neck pulsate very distinctly. There are no glandular enlargements in the cervical region. A small kernel is palpable in the right axillary region. The inguinal glands of both sides are very slightly enlarged, but not more than is frequent in men. Œdema of the lower extremities in moderate degree extends from the feet to within a few inches below the knees; there is very slight œdema at both wrists. When examined in the recumbent position the costal arch in the left infra-axillary region is somewhat bulging, and the left side of the abdomen appears distended with a uniform mass. A fulness is apparent in the epigastric region. On palpation, corresponding to the visible enlargement in the left half of the abdomen a firm mass is to be felt, which apparently emerges from beneath the left costal arch. Its surface is smooth and its borders everywhere regular. The lower end of the structure is rounded and extends to within three finger-

breadths of the pubic bone. Below the umbilicus the mass extends an inch beyond the median line. One inch below the level of the umbilicus is a small depression or notch; above, the inner border disappears beneath the costal arch in about the parasternal line. The left border of the tumor, beginning below, lies parallel with Poupart's ligament, and above is indistinctly palpated in the lumbar region. One is able to grasp the lower pole as well as the inner border of the tumor. It moves with respiration in a diagonal direction, and the mass permits lateral movement. Pain is not experienced on deep pressure or otherwise. The mass is continuous with a dulness which extends to the sixth rib in the anterior axillary line and the eighth rib in the posterior axillary line. Intestine is not to be demonstrated between the structure and the abdominal wall.

All the requirements for the diagnosis of an enormous enlargement of the spleen are satisfied by the physical signs present in the case. Corresponding to the visible distention in the epigastric region a uniform mass can readily be made out, which emerges from beneath the costal arch and sternum and extends downward to within one and a half inches above the level of the umbilicus. From this point a very sharp, regular border may be traced well into the lumbar region on the right side. In the mammary line the lower border is about one hand's-breadth below the costal arch. The surface of this mass is smooth and firm and not painful on pressure. Respiratory mobility in a direction parallel to the long axis of the body is present. The upper border of the liver is in its normal position. It is evident that the mass in the epigastric and right hypochondriac region is an enlarged liver. Upon auscultation over the spleen a loud bruit is everywhere to be heard. No friction rub is audible over either the spleen or the liver. Slight ascites is present. There are no palpable retroperitoneal glandular enlargements. The examination of the lungs, aside from the dulness in the region corresponding to the enlarged spleen, shows a few moist râles in the infrascapular region of the left side. There is no increase in the size of the heart on percussion. The apex-beat is in the fifth interspace just inside the mammary line. A faint, systolic, accidental murmur is heard over the base of the heart. Genitals and rectum normal. Ophthalmoscopic examination shows no retinal hemorrhage. No tenderness of the sternum or any other bone is present. The temperature at the time of examination is normal. One would not hesitate to make a provisional diagnosis of splenic leukæmia on the history, signs, and symptoms present in the case. With such findings it would be extremely rare that the blood examination would fail to corroborate the diagnosis.

Examination of the Blood, April 17, 1898. Macroscopical appearance: Blood very pale and thin; coagulates slowly and imperfectly. Microscopical, fresh specimen: The red blood-corpuscles show only slight differences in their size, form, and color; no poikilocytosis; there is an evident paucity of cells; rouleaux formation is absent; there is no increase in the fibrin; leucocytes apparently not increased. Blood count: Red blood-corpuscles per cubic millimetre, 1,740,000; white blood-corpuscles per cubic millimetre, 5214; hæmoglobin (Fleischl), 30 per cent.; color index, 0.86. Stained specimen: Neither nucleated red blood-corpuscles nor abnormal forms of leucocytes found. Among 587 leucocytes the following relation of the different forms was observed:

Polynuclear neutrophile, 390 (66.4 per cent.); eosinophile, 5 (0.8 per cent.); transitional forms, 18 (3 per cent.); large mononuclear, 22 (4 per cent.); small mononuclear or lymphocytes 152 (25 per cent.).

During the following two weeks seven examinations of the blood gave practically the same results as those described. The urine was negative. I do not wish to enter into the details of diagnosis here, as I shall consider it in dealing with the literature in a subsequent paper. Suffice it to say that without difficulty one would be able to exclude neoplasm and echinococcus cyst. No cause for amyloid degeneration is present. Under the circumstances a malarial cachexia is not to be seriously considered. The causes of cirrhosis of the liver are absent, and the course of the affection has been unlike that of cirrhosis. The size of the spleen is greater than is found in that affection. The history and physical examination correspond accurately to the clinical picture of splenic leukæmia. In the absence of leukæmic blood findings there is but one diagnosis to be made, and that is splenic pseudoleukæmia. On April 25th thirty grammes of grape sugar were administered, which resulted in alimentary glycosuria. The patient came to the clinic from April 16th until May 7th, when he was admitted to the Cook County Hospital, in the medical service of Dr. James B. Herrick, to whom I now acknowledge my thanks for his kindness in allowing me to follow the clinical features of the case until the patient's death. When admitted to the hospital the patient's condition had not materially changed from that on the date of the first examination, with the exception that he was somewhat weaker. Iron, arsenic, and bitter tonics were administered, and the patient remained in bed the greater part of the time. The appetite did not improve; the man gradually lost strength and flesh, but no discomfort was experienced. The temperature was normal, with the exception of a slight rise now and then in the afternoon; the pulse-rate ranged from 76 to 120. The pallor, œdema, and ascites gradually increased. The condition of the blood did not change, with the exception of a gradual reduction in the number of red blood-corpuscles and in the amount of hæmoglobin. July 7th, a friction fremitus and rub was distinctly felt and heard over a small area of the liver in the epigastric region. Pain was present over the same area. July 14th, friction rub heard all over the portion of the liver exposed. Subcrepitant râles in the lower portion of the lung posteriorly. Temperature normal. Epistaxis now and then present. July 16th, splenic puncture; withdrew 10 c.c. of blood (see experimental research). Blood from the spleen was richer in leucocytes than the blood from the ear, but no abnormal elements were found. Examination of the blood taken from the ear of the patient July 17th: An average of 768 squares gave red blood-curpuscles, 568,000; white blood-corpuscles, 8000; hæmoglobin (Fleischl), 10 per cent. No marked change in the size and form of the corpuscles; no nucleated red cells; no abnormal white corpuscles found; the normal relation of the different forms was preserved. The slight increase in the white cells was probably due to an infection in the region of the parotid gland. A few days previous to the blood examination on July 17th a needle-prick in the lobe of the right ear continued to ooze thin, watery blood for more than one hour. No doubt infection took place at that point. July 28th, an abscess appeared in the parotid region; this was drained. No temperature. Spleen apparently growing smaller. Friction rub has disappeared from the liver region.

Involuntary evacuations began and continued until death. The patient gradually became weaker and the ascites increased. Dulness was noted over both lungs posteriorly, a condition of extreme marasmus was finally present, and the patient died August 17th at 6.45 A.M.

Autopsy, August 17, 1898, by Dr. E. R. LeCount, three hours after death. Body much emaciated; no rigor mortis; skin and conjunctivæ subicteric; opening in region of parotid gland, from which pus is escaping. Absence of fat in abdominal wall. Diaphragm at sixth rib. Spleen extends to two inches below crest of the ileum, anterior border on line of the middle of the left rectus. Ascitic fluid present in large quantity. Liver extends to crest of ileum on the right side. Both pleural cavities contain yellow fluid. Right pleura slightly adherent at centre of lung. Lungs: Right, no area of consolidation; part of lower lobe non-crepitant; contains icteric fluid. Left lung same as right. Peribronchial lymph-glands not enlarged. Heart: Valves competent; endocardium smooth and pale, with ecchymoses beneath; myocardium firm, light colored, uniform in consistency and appearance; aorta negative, with the exception of slight atheroma.

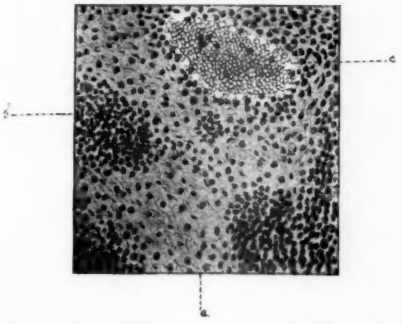
Retroperitoneal glands are small and pinkish and form a chain about the abdominal aorta. On section they are firm and grayish-red; they show no softening and no yellow areas; they have the appearance of true hyperplasia. Spleen: Weight, 2350 grammes; 31 x 16 x 9.5 cm.; smooth surface, bluish-gray; small whitish areas in capsule. On section, red, firm, and uniform. Wedge-shaped areas under capsule, which contain blood. Other white, wedge-shaped areas, with hemorrhagic circumference. Malpighian corpuscles not visible; connective tissue apparently not increased. Kidneys negative. Bladder and urethra negative. Adrenals negative. Liver: Weight, 2800 grammes; 35 x 19 x 16 x 9 cm.; smooth outline, no adhesions. On section, lobular markings indistinct; structure is uniform and firm; consistency not increased; biliary apparatus negative. Pancreas pale. Mouth negative. Tonsils and glands at base of tongue not enlarged. Larynx and trachea negative. Stomach: Near the pyloric end are a number of minute, circular areas, with elevated, reddish centres, presenting polypoid growths. One, near the pylorus, is 1 cm. in height. Mucous membrane pale. Small intestines pale. No enlargement of the lymphatic apparatus of the intestine. Large intestine and rectum negative. Mesenteric glands slightly enlarged; no softening or yellowish areas. Skull reddish-pink; the bone is of hemorrhagic character. Meninges negative. Brain negative. Right axillary glands slightly enlarged, and correspond to the description of the retroperitoneal lymph-gland; those of the left axilla are enlarged, though less so. In each groin slight lymphatic enlargement is present.

Bones: The whole length of the femur is filled with dark-red material, soft in consistency. The bony structure is lessened; it corresponds to red marrow of the fœtal bone. Near the upper end of the femur an area of yellowish, hemorrhagic tissue is rather sharply differentiated from surrounding softer and redder lymphoidal tissue. Some fœtal condition of bone is found in the ribs, sternum, and small bones of the feet. All the bones were fragile, due to the invasion of the compact tissue with lymphoidal or fœtal bone-marrow. In the chest-wall (right side) a small nodule is found under the pectoral muscle between the

mammary and axillary glands. Although slightly fibrous in character, it most resembles a lymphatic structure.

Histology. Spleen: The majority of the Malpighian corpuscles show only slight alterations. Many appear normal; others present a slight increase in the reticular tissue, and now and then a Malpighian body is found which shows considerable sclerosis. No marked degenerative changes are to be seen in the cells. The veins show a moderate increase

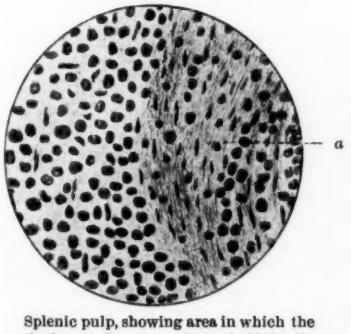
FIG. 1.



a. Connective tissue invading pulp. *b*. Group of lymphoidal cells surrounded by connective tissue. *c*. Splenic vein.

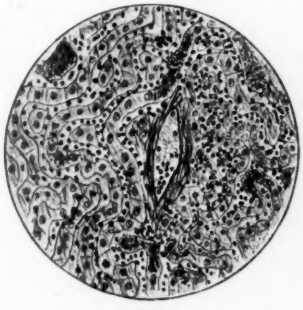
in the connective tissue which surrounds them; areas are found where this increase is very marked. Fibrous tissues extend some distance into the splenic pulp, enclosing within its meshes lymphoidal cells, isolated and in groups (see Fig. 1). In many places the pulp appears normal; however, in general it is apparent that the reticulum is con-

FIG. 2.



Splenic pulp, showing area in which the reticulum is fibrous. *a*. Lymphoidal cells.

FIG. 3.



Liver.

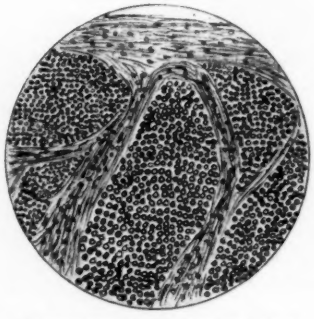
siderably increased. Now and then are to be found areas of marked sclerosis containing lymphoidal cells in the meshes of the fibrous tissue (see Fig. 2). Nowhere in the spleen are signs of acute inflammation

or marked degeneration of cells to be found. Section through the infarcts in the spleen shows nothing more than is usually found.

Liver: The liver shows a very slight increase in the interlobular connective tissue, with marked infiltration of lymphoidal elements between the lobules and liver cells (see Fig. 3). The cellular infiltration resembles somewhat that found in leukæmia. Considerable granular pigment is present.

Lymph-glands: The slightly enlarged retroperitoneal, mesenteric, inguinal, and axillary glands present hyperplasia of both connective tissue and lymphoidal elements. The connective tissue, however, shows the greater increase. Fibrous bands surround lymphoidal areas, and the lymph-cells are separated by a visible reticulum. The inguinal glands show much more connective tissue increase than any of the others. They present a condition of real fibrous hyperplasia (see Fig. 4). The retroperitoneal, mesenteric, and axillary glands are practically alike in their histology. The hyperplasia of the connective tissue is not nearly as marked as in the inguinal glands (see Fig. 5).

FIG. 4.



Fibrous hyperplasia of inguinal gland.

FIG. 5.

Retroperitoneal lymph gland.

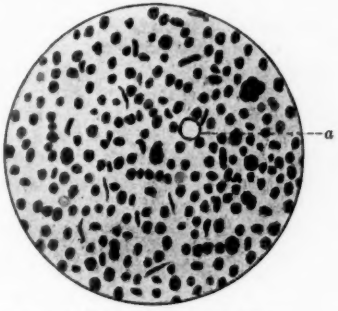
Bone-marrow: The medulla of the femur, which was similar in macroscopical appearance to that found in the other bones, is made up of lymphoidal cells arranged in groups or singly, contained in a fine network of connective tissue. Here and there were areas in which capillary spaces containing blood-corpuscles predominated, with an occasional lymphoidal cell contained within the fine network of connective tissue and capillary walls (see Fig. 6). Ehrlich's stain reveals nucleated red blood-corpuscles. The lymphoidal area found in the femur, previously described in its macroscopical appearance, is made up of lymphoidal cells arranged either singly or in groups, surrounded by a reticulum of finely fibrillated connective tissue, much greater in amount than in the medulla. Bloodvessels with distinct walls permeated the structure, but no aggregation of capillaries such as is described in the medullary tissue is to be found (see Fig. 7). The polypoid growth in the stomach showed a proliferation of the normal glandular structure, containing in it areas of round-cell infiltration. Projecting into the centre of its growth is fibrous tissue, rich in bloodvessels. The small tumor in the thorax is made up of fibrous tissue, which contains within its meshes lymphoidal

cells. The heart muscle shows slight granular degeneration. Lungs negative; parotid gland, adrenals, and pancreas negative.

FIG. 6.

Bone marrow of femur, showing fetal condition.

FIG. 7.



Lymphoidal area in medulla of femur. *a*. Bloodvessel.

Experimental Research. It is believed by many investigators that both leukæmia and pseudoleukæmia are due to some form of infection. The nature of the infection is not always specified. Some regard the infective agent as a micro-organism. According to Grawitz, twenty-nine cases of pseudoleukæmia have been reported in which bacteria have been found in the swollen glands. Recently Delbet claims to have cultivated a bacillus from the spleen in a case of pseudoleukæmia, and that inoculation of dogs with this micro-organism resulted in the production of glandular swelling. For reasons stated in the section on a theory regarding the origin and nature of pseudoleukæmia, it seems probable that the disorder is located primarily in the spleen, and that the anæmia and cachexia are in some way secondary to the splenic affection.

Ante-mortem Research. With a view of determining, if possible, whether micro-organisms or other toxic agents were present in the spleen, on July 16th, after most careful preparation, 10 c.c. of blood was aspirated from that organ. Tubes containing the following media were inoculated: Glucose and lactose bouillon, milk, human blood-serum, Loeffler blood-serum, glycerin agar, nutrient agar, and gelatin. The spleens of a guinea-pig and rabbit were inoculated through a laparotomy incision. The tubes remained sterile, with the exception of the one containing human blood-serum. Upon this a coccus developed, which proved to be the staphylococcus pyogenes aureus. On the third day after inoculation the guinea-pig showed a portion of gut protruding from the anus, which became gangrenous, resulting in death in three days. The organs were sterile and the histology of the spleen normal. August 3d the rabbit died, and autopsy by Dr. H. G. Wells showed the stomach enormously distended with food, and signs of hemorrhagic gastritis. Spleen and liver normal in size; other organs negative. Histology of spleen and liver negative.

Post-mortem Research. (Autopsy three hours after death.) The same kind of culture media was used as in the ante-mortem experiment.

The tubes were inoculated from the spleen, liver, bone-marrow, and blood from the heart. On an agar tube inoculated from the spleen a bacillus developed which subsequently satisfied the requirements of the bacterium coli commune. Ordinary staphylococci developed on a tube of blood-serum. Another blood-serum tube, inoculated from the liver, developed the bacterium coli commune. All other tubes were negative. An emulsion was made by macerating a small portion of the spleen in about four times the quantity (by weight) of sterilized water. The emulsion was carefully filtered, and three full-grown rabbits and two guinea-pigs were inoculated with the filtrate. The veins of the ears of two of the rabbits were injected, each with 2 c.c. of this extract. Both rabbits died during the following night. Cultures from the heart-blood were negative. The intravenous injection of mice with the blood of the rabbits proved negative. Autopsy on rabbits showed no apparent cause of death. The histological examination of the lungs, spleen, and liver of both rabbits was negative. Five c.c. of the same filtrate was injected into the peritoneal cavity of a guinea-pig, which lived until September 12th. During the last two weeks the animal showed signs of emaciation. Unfortunately, the autopsy was not held until twelve hours after death. The bacterium coli was found in the heart-blood. The peritoneum and organs showed neither macroscopical nor microscopical change. The spleens of a guinea-pig and a rabbit were inoculated with a portion of the same filtrate, with negative results.

Conclusions. The staphylococcus found in the experiment performed ante-mortem may have been located in the skin. The staphylococcus derived from the spleen from the inoculation made post-mortem may readily be explained by the fact that just previous to death a suppurating wound was present in the parotid region. The presence of the colon bacillus in the spleen and liver after death from marasmus is not surprising. The cultivation of the colon bacillus from the blood of the heart of the guinea-pig twelve hours after death is irrelative. No micro-organisms were found in the microscopical section of the tissue of the spleen or any other organ. The inoculation experiments performed both ante-mortem and post-mortem were negative as regards the finding of a specific micro-organism. The death of the two rabbits so soon after the intravenous injection of an aqueous extract of the spleen renders it very probable that an abnormal toxic substance of some nature was present in the organ. Whether that toxic substance had been produced throughout the course of the disease, and whether it was responsible for the anæmia and general malnutrition in the disease, is, in the light of our present knowledge, mere speculation.

THEORY REGARDING THE ORIGIN AND NATURE OF THE DISEASE. Although disorders of the spleen have been studied by the medical profession from the time of remote antiquity, our knowledge of the origin and nature of a number of types of disease associated with splenic enlargement is still very indefinite. Splenic pseudoleukæmia shares in the general obscurity which surrounds the forms of disease closely allied to it—namely, leukæmia and the other varieties of pseudoleukæmia. The number of cases thus far accurately observed has been so limited that one has less than is to be desired upon which to base conclusions.

Hypertrophy of the spleen and progressive anæmia are the most prominent features of the disease. The constitutional symptoms and course of the affection may be satisfactorily explained by the progressive alterations in the blood. Whether other factors, aside from complications, contribute to the fatal termination, our present knowledge will not permit us to affirm or deny. It is rational to presume that the two principal features of the disease—progressive anæmia and enlargement of the spleen—are either directly dependent on each other or that both are manifestations of a common cause. A study of the origin and nature of pseudoleukæmia involves a consideration of the following questions: 1. Is the hypertrophy of the spleen a result of the progressive anæmia, and, if so, upon what does the anæmia depend? 2. Do the chief features of the disease—progressive anæmia and splenic hypertrophy—arise from a common cause? 3. Is the progressive anæmia and general malnutrition due primarily to the pathological changes in the spleen, and, if so, what induces those changes?

Let us first discuss whether it is probable that the splenic hypertrophy is due primarily to the alterations in the blood. If this be true the cause of the anæmia is not apparent, and the disease must be classed as an essential anæmia. In chlorosis the spleen is not infrequently palpable. Among fifty-six cases of undoubted chlorosis, Chvostek was able to palpate the spleen on deep inspiration in thirteen cases. In primary progressive pernicious anæmia the spleen may be enlarged sufficiently to be palpated. However, in both forms of essential anæmia splenic enlargement, when present, is always moderate, seldom reaching more than a finger's-breadth below the costal arch. It fluctuates in size during the course of the disease, and never reaches the enormous tumefaction often found in splenic pseudoleukæmia. A very slight enlargement of the spleen has also been observed in secondary anæmia and in anæmia artifically produced, both in man and in the lower animals. But in the forms of anæmia just described the spleen is often normal in size and at times atrophied. Mosler, Gast, and others regard the moderate enlargement of the spleen which is present in anæmia as a compensatory process. On the other hand, Immerman, Eichhorst, Müller, Neuman and others do not believe that in the conditions enumerated the spleen reverts to its embryonal blood-producing function. Others believe the enlargement due to an increased destruction of red blood-corpuscles. From all available evidence it would appear that while anæmia may give rise to an enlargement of the spleen, its size is always moderate and never approaches the enormous hypertrophy commonly recorded in splenic pseudoleukæmia. Still greater evidence against the theory that the splenomegalia in this disease is due to anæmia is afforded by the fact that in all cases thus far reported splenic hypertrophy preceded the anæmia, and in some cases for a

period of a year. From the foregoing it is very improbable that the enlargement of the spleen in splenic pseudoleukæmia is a consequence of the progressive anæmia.

The second question, as to whether the chief features of the disease —progressive anæmia and splenic hypertrophy—arise from a common cause, is extremely difficult to discuss. It is possible that the true solution of the problem lies in that direction. However, in the absence of all direct and indirect evidence favoring that interpretation, it will not be profitable to enter into a discussion of possibilities. On the other hand, the theory which makes the enlargement of the spleen primary, and the progressive anæmia secondary, to the splenopathy has very much in its support. In the cases thus far reported, splenic hypertrophy has preceded the anæmia and other constitutional symptoms of the disease. We must next consider whether the pathological changes which occur in the spleen are capable of inducing the profound alterations in the blood and general nutrition which accompany the disease. Accurate knowledge of the function of the spleen would be of inestimable value in the solution of the problem. Unfortunately, very little is known regarding its function. An extended discussion of the various theories regarding it is beyond the province of this paper. The following are some of the more prominent advocated: 1. During fœtal life and shortly after birth, in man, the spleen is supposed to produce red blood-corpuscles. In some animals this function is retained during life. There is no positive evidence that this obtains in the adult life of man. 2. It is believed, on rather unsatisfactory evidence, that the spleen is engaged in the destruction of red blood-corpuscles. 3. White blood-corpuscles, chiefly of the large mononuclear variety, are probably formed in the spleen. 4. The theory of Schiff and Herzen, that the spleen produces a substance (an enzyme) which, being carried by the blood to the pancreas, acts upon the trypsinogen contained in the gland, converting it into trypsin, has not been confirmed by other investigators. While there is very little positive evidence as to the exact function of the spleen, it is generally conceded that the organ in some way exerts an influence on the constituents of the blood. That the spleen is not necessary to life has been demonstrated repeatedly by its entire removal. However, this does not prove that it is functionless, since vicarious organs may perform its work. It is interesting to note that in a few instances, after removal of the organ, the lymph-glands have shown a moderate increase in size. Since the removal of the spleen is not incompatible with perfect health, it is not reasonable to presume that the malignant course of splenic pseudoleukæmia is due to suspension of the normal function of the gland in consequence of its hypertrophy. On the other hand, it cannot be denied that the pathological changes in the spleen may alter its function in

such a way as to result in grave disturbances of nutrition. If the spleen is normally engaged in the destruction of red blood-corpuscles, possibly an abnormally great destruction of these elements takes place as a result of splenic hyperplasia. It is claimed by a number of investigators that the blood in the splenic vein normally shows a marked difference in its constituents from that contained in the splenic artery. The results obtained have varied so greatly that one is unable to draw specific conclusions. They render it very probable, however, that the normal spleen is actually engaged in metabolic processes. The complex chemical composition of the spleen, and especially the presence in its tissue of a number of nitrogenous extractives, such as xanthin, hypoxanthin, adenin, and uric acid, strongly favors that conclusion. Aside from these substances, the tissue of the spleen contains inosite, tyrosin, leucin, formic, lactic, and butyric acids, and cholesterine. Its chief mineral constituent is an organic compound of iron. Possibly chemical agents are elaborated by the diseased spleen, which, either in the gland or after they gain access to the circulating blood, inhibit the production of red blood-corpuscles or cause their dissolution, and thus induce anæmia. An analogous theory explains the anæmia of exophthalmic goitre, on the grounds that an enlarged thyroid produces toxins capable of causing dissolution of red blood-corpuscles. That a toxic substance of some nature was present in the tissues of the spleen in my case is probable from the evidence obtained by injecting the veins of rabbits with a few cubic centimetres of the filtrate of an emulsion of a small portion of the spleen. The animals died within a few hours, and no adequate cause for death was present at post-mortem. Whether this toxic substance was capable of destroying the red blood-corpuscles was not determined by the experiment. The blood of the rabbits showed no apparent histological changes in the several slides examined. There is nothing in the histology of the spleen in splenic pseudoleukæmia which would favor the theory that the anæmia was secondary to the splenic hypertrophy. The histological changes constitute a true hyperplasia, and present nothing which differentiates it essentially from other forms of splenic hypertrophy that are not accompanied by progressive anæmia. The greatest evidence, however, in favor of primary splenopathy, in splenic pseudoleukæmia, is afforded by the results of total extirpation of the hypertrophied organ. Even after hemorrhages, œdema, and signs of cachexia were well developed removal of the hypertrophied spleen has resulted in recovery (see résumé below). The fact that complete recovery took place after the removal of the hypertrophied spleen in five cases of splenic pseudoleukæmia points directly to the spleen as the source of the anæmia.

TREATMENT. The treatment of splenic pseudoleukæmia is medicinal and surgical. The indications to be met in medicinal treatment are to

build up the blood and general nutrition. Iron, arsenic, and other drugs having a similar therapeutic influence should be administered. Rest in bed should be enjoined, and constipation, if present, relieved. Special symptoms, as nausea, vomiting, diarrhœa, and pain, require the same treatment as when due to other causes. In the later stages diarrhœa may be so persistent as to require great care in its treatment. The disease is modified only temporarily by internal modification.

Surgical Treatment. If the disease is primarily located in the spleen, and the pernicious course of the affection is due to the effect of the pathological changes in that organ upon the blood and general nutrition, it would be a rational procedure to remove the spleen as soon as the diagnosis is positive and when no special contraindication is present The number of splenectomies performed in which this disease was undoubtedly present is very small. In reviewing the literature of splenectomy it is exceedingly difficult in many cases to determine the nature of the disease for which the operation was performed. As a rule, the operator has been more concerned in the technique of his operation than with the nature of the pathological process for which it was performed. The justification of that statement is furnished by the fact that in the total number of cases (about 190) in which the spleen has been removed a microscopical examination of the blood has been recorded in less than twenty cases, and in some of these only imperfectly. Since a blood examination is necessary to the diagnosis of splenic pseudoleukæmia, it would be futile to search for cases of that disease among the affections in which splenectomy has been performed outside of the limited number in which the blood has been examined. I will give a short résumé of the cases in which splenectomy has been performed, where it seems probable that the disease present was splenic pseudoleukæmia:

Case I.—Operator, Spencer Wells; date, 1865. Female, aged thirty-four years. Symptoms: Marked anæmia, slight increase in the white blood-corpuscles (character of corpuscles not noted). Weight of spleen, 2672 grammes. Result, death.

Case II.—Operator, Péan; date, 1876. Female, aged twenty-four years. Patient never had malaria nor any serious illness. Eighteen months before operation a splenic tumor appeared. Six months previous to operation signs of anæmia present; subsequently anæmia gradually progressed. Digestion greatly disturbed, violent neuralgic pains, hæmoptysis, hæmatemesis, hæmaturia, and bloody stools were recorded; no leucocytosis. Weight of spleen, 1125 grammes. Result, in one month patient had recovered perfectly; subsequently died of toxic enteritis.

Case III.—Operator, Czerny; date, 1878. Female, aged thirty years. No history of malaria. Spleen large and movable; no leucocytosis; general health very poor; digestion disturbed; signs of anæmia; disturbed menstruation; weight of spleen not given; size, 23 x 12 x 8 cm. Result, complete cure.

CASE IV.—Operator, Franzolini; date, 1881. Female, aged twenty-two years. Never in good health; at twelve years of age she suffered from œdema and ascites, from which she recovered. Menstruated at seventeen, but always irregularly; was subject to hysteria; never had malaria. About two years previous to operation the patient noticed constant pain in the left hypochondriac region. Pain was increased on pressure and in the erect position. Patient grew weak, and when admitted to the hospital a tumor was readily detected in the left hypochondriac region, which proved to be a hypertrophied spleen. Sufferings of the patient and signs of anæmia increased. Skin and mucous membrane were very pale; great muscular fatigue; vomiting obstinate; panniculus adiposus greatly reduced. Leucocytes: Five times the normal number were present. Weight of spleen, 1526 grammes. Result, complete cure. All suffering ceased and the oligæmia disappeared. Thirty-six days after operation the white corpuscles were reduced to one-half the number present at the time of the operation. This case was reported as a leukæmia, and is usually so regarded. The method employed to estimate the leucocytosis was subject to inaccuracies. An increase of leucocytes to five times the normal number is not sufficient evidence for the diagnosis of a leukæmia unless the quality of leucocytosis was that which is peculiar to leukæmia. Banti is also of the opinion that this case was not a leukæmia.

CASE V.—Operator, Frascani. Female, aged sixteen years. No hereditary influence; never had malaria or syphilis; had noticed a large tumor in the left half of the abdomen for two years. During this time epistaxis, fever, and diarrhœa were now and then present. Mucous membranes pale. Signs of anæmia began one year before the operation, and were marked at the time of operation; œdema and ascites present. Blood examination: Red blood-corpuscles, 3,900,000; white blood-corpuscles, 7030 per cubic centimetre; hæmoglobin, 68 per cent. External lymph-glands slightly enlarged. Result, death in four hours from hemorrhage. Weight of spleen, 1310 grammes. Weight of liver, 1050 grammes.

CASE VI.—Operator, Ceci; date, 1893. Female, aged thirteen years. Disease began two years previously; signs of anæmia and tendency to hemorrhage from the gums; bones normal; muscles weak; adipose tissue thin; abdominal tumor firm and smooth. Blood examination: Red blood-corpuscles, 3,592,000; white blood-corpuscles, 15,000 per cubic centimetre; hæmoglobin, 65 per cent. Weight of spleen, 1300 grammes. The quality of leucocytosis not recorded. Result, recovery.

CASE VII.—Operator, Lindfors; date, 1892. Female, aged twenty years; constitution weak. Five years previous noted tumor in the left side of the abdomen; signs of anæmia were present. The red blood-corpuscles were diminished and the hæmoglobin was especially reduced in quantity; the relation of the white to the red blood-corpuscles was 1 to 250. No thyroid or lymphatic enlargements. Size of the spleen, 25 x 15 x 7 cm. Result, recovery.

In all I find seven splenectomies in which the records are sufficiently explicit to justify a very probable diagnosis of splenic pseudoleukæmia. There are other cases that appear to belong to the same type of disease, but, owing to the meagreness of the records, I have not felt justified in

including them. Five among seven cases in which it is reasonably certain that splenic pseudoleukæmia was present were cured by a removal of the hypertrophied organ. The remaining two died of hemorrhage. In not one of the seven cases was operation performed early in the course of the disease. In at least two of the five cases that recovered the disease had advanced well into the cachectic stage. When we consider that splenic pseudoleukæmia is a progressive disease, which, so far as has been recorded, invariably terminates fatally when treated medicinally, it is apparent from the statistics that splenectomy should be performed as soon as the diagnosis is positive and the case not too far advanced to preclude possibility of recovery. As a rule, in splenectomy the mortality increases with the size of the spleen. In none of the cases, however, in which recovery took place was the spleen less than five times the normal size. In one case, which resulted in cure, the hypertrophied organ was nearly eight times as large as normal, and the cachexia was extreme. The mortality after operation in this disease is very much less than when leukæmia is present. Douglas reported thirty-six cases of splenectomy for leukæmia, with only five recoveries, and three of these I have included as cases of splenic pseudoleukæmia.

PERFORATION OF THE STOMACH IN AN INFANT SEVEN WEEKS OLD.

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The following case is reported as unusual and of especial interest from a pathological stand-point:

A male infant, aged seven weeks, was admitted to the Infants' Hospital, February 2, 1899. The history given at the time of entrance was that the infant had been well until four days previously, when his abdomen became suddenly much distended and he appeared to suffer considerable pain. After the first twenty-four hours the bowels had moved regularly and the pain had lessened. Vomiting had begun about eight hours before entering the hospital.

An examination by Dr. Dane, the surgeon-in-charge, and by Dr. Morse showed a well-developed and fairly-nourished infant. The facial expression was rather drawn, the eyes dull, and the abdomen much distended and tympanitic, excepting that there were very slight areas of dulness in both inguinal regions. A few coils of distended intestine could be detected. The pulse was 165, the temperature 101° F., and the respirations 35. The diagnosis of peritonitis was made, and it was decided to operate at once. Ether was given, and an incision four inches long was made in the median line, and about 2 drachms of slightly flaky serum exuded. The vessels of the much-distended small intestine, and especially of the mesentery, were found to be very much

injected. A few flakes of lymph were found adhering to the intestines. The intestine was thoroughly examined, practically through its whole extent, without any cause for the peritonitis being discovered. The abdominal cavity was irrigated and the wound closed. Three days later the infant died.

FIG. 1.

Normal size.

Eighteen hours after death the autopsy was made by the pathologist to the hospital, Dr. W. F. Whitney, to whom I am indebted for the pathological diagnosis and for the sections of the lesion.

The body was that of a well-developed infant; rigor mortis was present.

FIG. 2.

Normal size.

There was an incised wound about 6 cm. long in the median line of the abdomen just below the umbilicus. This was partly closed at the ends by interrupted sutures, while from the middle projected a wick of gauze. This reached well down to the root of the mesentery, and was surrounded by coils of intestine, which were glued to the abdominal

wall and to each other. There was no free fluid in the pocket drained by the wick. The adhesions between the coils of intestine could be easily separated, and lying between them was a little opaque, turbid serum in which were occasional flakes of lymph.

The head was not opened.

The lungs were of normal color, well retracted, with a few dark, slightly depressed areas. The pleural surface was smooth and the cavities normal.

The heart was normal and weighed 65 grammes.

FIG. 3.

The condition of the lower part of the peritoneal cavity has been previously described. The stomach was quite extensively adherent to the diaphragm along its anterior surface, and on carefully separating the fibrinous adhesions one point was noticed where the exudation was a little thicker and more adherent. Embedded in this, and apparently coming from the wall of the stomach, was a minute thread about 2 or 3 mm. in length. There was also a little more injection than elsewhere in the immediate vicinity of this spot.

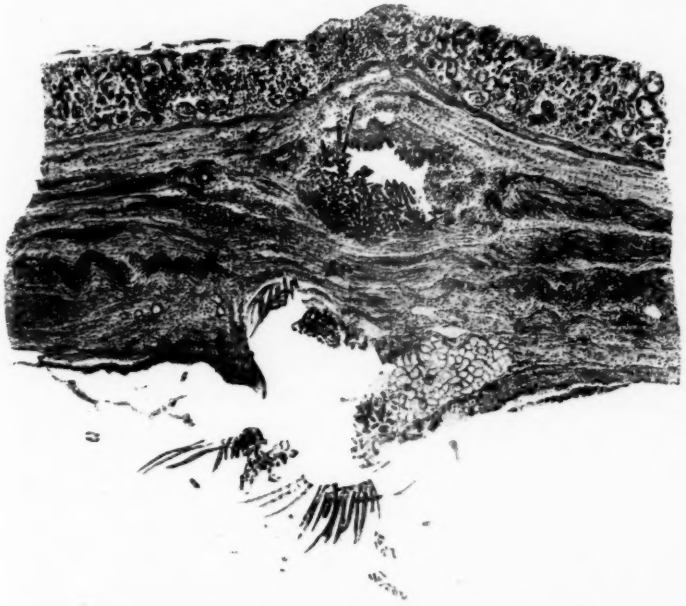
On opening the stomach it was found to be generally normal, with the exception of a minute loss of substance surrounded by a reddened zone opposite the place of greatest exudation on the outside.

This portion of the wall of the stomach was cut out, and after hardening in Zenker's fluid was mounted in paraffin and a series of sections cut. As the result of the studies of these it appeared that there was an oblique passage from within outward through the entire thickness of the wall, and in it lay a foreign body. This was made up of a

bundle of very small, irregularly rounded, structureless fibres, staining intensely with aniline dyes, but not with hæmatoxylin.

The edges of the mucosa were slightly rounded over from within outward, as if the original lesion had been in that direction. The cavity in the middle of the coat was partly filled with leucocytes and round cells surrounding the fibres, but not infiltrating among them, and nowhere did the foreign body project into the interior of the stomach.

FIG. 4.



After staining by Gram's method, large numbers of small rod and spherical bacteria were found on the peritoneal surface close to the thread. No cultures were taken at the autopsy, on account of the lapse of time after death.

The liver was normal in appearance and weighed 165 grammes.

The kidneys were pale and together weighed 35 grammes.

The spleen was dark red and weighed 15 grammes.

The pancreas, adrenals, and the genital organs presented nothing remarkable.

The chief interest in the case centres in the perforation and its cause. That the general peritonitis had started from this point there was little doubt, as the evidences of the inflammation were most extensive here and the exudation thicker and firmer. It is highly improbable that this could have been anything introduced at the time of the operation, for to have produced the lesions would have required several days, as

shown by the thinned and somewhat everted mucosa. How the perforation took place from the inside is also hard to understand if this foreign body is nothing but a bit of silk thread, as its structure would indicate. It is suggested that possibly a threaded needle was swallowed, and had perforated, leaving a bit of silk behind, and the needle was overlooked among the coils of intestines. It certainly was not thought of at the time of the autopsy, and no especial search was made for it. Another suggestion is that it was a case of follicular ulceration, and the bit of thread had worked its way into that. But the loss of substance in the mucosa is rather less in extent than deeper in, and there is no evidence of any inflammation in the neighborhood that would warrant the assumption of such a process.

We are left, therefore, with the simple fact that the local lesions are all in the immediate neighborhood of the foreign body, and that the perforation and the secondary fatal peritonitis must be referred to it.

The appearances to the eye and under the microscope are well shown in the accompanying drawings made by Miss Byrnes.

A CRITICAL SUMMARY OF RECENT LITERATURE

CONCERNING

SOME RECENTLY DESCRIBED REFLEXES.

By Joseph Sailer, M.D.,
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Since the original discovery by Westphal, in 1875, that a blow upon the patellar tendon caused a contraction in the quadriceps extensor of the thigh, the subject of tendon and other reflexes has received an enormous amount of consideration, but even in this long period all the possible simple reflexes, so called, have not been recognized and described, or, at least, it would seem not, for nearly every year a new one is discovered or one that was forgotten resurrected. Among the most recent may be mentioned the *hypothenar* reflex. This was apparently first recognized by Stembo[1] in 1894, who noted that pressure upon the pisiform bone caused the appearance of a fold upon the ulnar side of the hand. He ascribed this to the contraction of certain small bundles of muscle fibres that arise from the edge of the palmar aponeurosis (the palmaris brevis). The reflex also involves the fixation of the

[1] Berlin. klin. Woch., 1894, No. 15.

palmar aponeurosis by the palmaris longus, otherwise, of course, the muscles could not produce a fold by their contraction. This article apparently excited very little interest, and it was not until four years later that Holtzinger[1] rediscovered it, apparently in ignorance of Stembo's work. He described the fold upon the ulnar surface of the hand, which, according to him, varies considerably in different people, being sometimes straight, sometimes arched, and agrees that it is produced by the contraction of the palmaris brevis. This contraction, he notes, is not the mere transient twitch such as occurs in tendon and periosteal reflexes, but is tetanic in character, lasting as long as pressure is continued, and varying directly with it in intensity. He also states that various paræsthetic sensations are occasionally perceived on the ulnar side of the hand. If the irritation is continued for some time the contraction becomes intermittent—that is to say, there are a series of twitches. The reflex is usually best elicited by pressure upon the pisiform bone, but may also be caused by pressure upon the flexor tendon in the hand, by pressure upon the end of the little finger, and by passive abduction of the little finger. It is not produced, however, by mere cutaneous irritation. Holtzinger, therefore, concludes that this is not a cutaneous but rather a tendon reflex. It differs from other tendon reflexes in part by the fact that it is produced when the muscle is slightly relaxed, and in part by the fact that the contraction is tetanic and not clonic in character. Neither Stembo nor Holtzinger claim that it is of any pathological significance. In a number of cases in which I have tested this reflex upon normal and pathological cases I was unable to determine that it occurred in connection with any particular condition. In three cases of hemiplegia it occurred distinctly in one and not in the other two on the paralyzed side. In one case of hysteria and in one of neurasthenia it was quite distinct. It does not seem to occur more readily, however, in cases in which the tendon reflexes are exaggerated. Although I have no notes of my observations, it seems to be present in about half of all normal persons. It is possible that more extensive investigations in functional cases of nervous disease will indicate that it bears some relation to them. I have also observed that instead of a single fold there are usually several that pass obliquely along the ulnar side of the hand, corresponding to the structure of the muscle.

The new reflex for the year 1898 was the toe reflex described by Babanski.[2] It consisted in the discovery that in certain conditions the toes were extended (flexed dorsally) when the sole of the foot was irritated. It has been known for a long time that the retraction of the foot upon irritation of the sole—that is, the ordinary plantar reflex—was asso-

[1] Neurologisches Centralblatt, 1898, No. 19.

[2] Progrès Médicale, 1898, p. 166.

ciated with plantar flexion of the toes. Babanski claimed that in disease of the pyramidal tracts irritation of the skin on the anterior portion of the sole, as by a needle prick, produced exactly the opposite effect—that is to say, the toes were extended—this movement being especially distinct in the great toe. He found this reflex in hemiplegia, in meningo-encephalitis, in epilepsy, transverse myelitis, and syringomyelia. It did not occcur in neuroses nor in cases of peripheral neuritis, myelitis, nor in tabes dorsalis. Occasionally it was present in cases where the reflexes were greatly exaggerated. He also makes the interesting observation that it is ordinarily present in infancy, and contends that this supports his view regarding its relation to the pyramidal tract. In a later publication[1] he mentions that he observed the phenomenon in three cases of organic paraplegia, in one case of spinal hemiplegia, and in one case of tabes dorsalis with meningo-encephalitis. He reiterates that it is an indication of lesion of the pyramidal tract, and believes that it is particularly valuable in distinguishing hysterical from organic hemiplegia.

Cohn,[2] who had seen Babanski's article, and was astonished by his claim that the toe reflex was one of the earliest symptoms, if not the earliest symptom of lesion of the pyramidal tract, undertook some extensive observations concerning its occurrence. He calls attention to the fact that nearly all cutaneous reflexes are characterized by a movement of flexion, and accepts Gad's explanation that this is on account of the greater susceptibility of the flexor centres. He found that in about 60 per cent. of all cases irritation of the sole of the foot produced flexion, in about 20 per cent. extension, in about 10 per cent. no movement occurred, and in 10 per cent. the results were doubtful. Usually extension was restricted to the great toe. In children he concluded that no toe reflex at all occurred. In pathological cases he found extension in a number of cases in which the pyramidal tract was involved, but it did not occur in any cases of tabes dorsalis nor of polyneuritis. In cases of meningitis there was prompt flexion, and in one case of hysterical monoplegia there was extension of the toes. In neurasthenia no reflex occurred in about 40 per cent. of the cases. Cohn argues that if we accept Jendrássik's explanation of the cutaneous reflexes, that they have a longer or more complicated arc than is required for the tendon reflexes, we should expect, in disease of the pyramidal columns, a weakening rather than an exaggeration of the movement. It may be possible, however, to assume that weakening of the flexors or the removal of inhibition from the extensor centres actually does occur. He concludes, therefore, that Babanski's toe reflex,

[1] La Semaine Méd., 1898, No. 40.

[2] Neurologisches Central., 1899, No. 13.

although commonly occurring in cases of organic disease of the pyramidal columns, is not pathognomonic.

Schuler,[1] in view of the contradictory conclusions reached by Cohn and Babanski, undertook to test the subject thoroughly. He classifies his results according to the sexes. In men he found that in 80 per cent. of the cases there was flexion, in 6 per cent. extension of the great toe, in 2 per cent. extension of all the toes, and in 10 per cent. no reflex whatever; in 2 per cent. the results were doubtful. In women the results were practically the same, with the exception that extension occurred in only 4 per cent. of the cases examined, and an indefinite reflex in 6 per cent. In children flexion occurred in 30 per cent., extension in 12 per cent., indefinite reflex in 18 per cent., and no reflex whatever in 40 per cent. This 40 per cent. was made up especially of children less than one year of age, and seems to contradict Babanski's contention that in young children dorsal extension occurs. His general results seemed to be, however, more in accordance with Babinski than with Cohn. In pathological cases the reflex was absent; in hysteria and tabes it was present in all cases with disease of the pyramidal tracts, and could be elicited by the slightest irritation. Schuler does not believe with Geigel and Cohn that this reflex depends upon alteration in the sensory conducting apparatus, for in six of his cases sensation was absolutely normal, and he concludes, therefore, that in difficult cases the toe reflex may be of value in discriminating between organic and functional disease. Personally, I have observed this reflex in one case of hemiplegia; in about forty other cases of various conditions, including neuroses with exaggerated reflexes, either flexion or no reflex occurred.

The pupillary reflexes have received a good deal of attention in the last year, and two forms that had been incompletely described, but were by no means generally known, have been investigated and analyzed. These are contraction associated with closure or attempted closure of the eye, described by Westphal and Piltz, and the so-called cortical or attention reflex (Aufmerksamkeits reflex), to which the latter has devoted two articles. Westphal[2] was led to investigate the eyelid phenomenon in Mendel's clinic by the discovery that the immobile and dilated pupils of a case of general paresis were strongly contracted when the patient made an effort to close the eyes against resistance. As a result of this he made a systematic examination of a great number of cases, in which the pupil did not react to light, and found that the phenomenon was practically constant. In order to determine whether this was not a very common associated movement, a number of healthy

[1] Neurologisches Central., 1899, No. 13.

[2] Ibid., 1899, No. 4.

persons and a number of persons suffering from functional nervous diseases with normally reacting pupils were also tested, and only in one case of hysteria was the symptom present. It is difficult to decide just what this pupillary reaction means. The fact that when the attempt is made to close the eye the eyeball rolls up and outward excludes the possibility of the influence of convergence or accommodation, and the latter is also rendered unlikely by the fact that in many of those eyes in which it appeared, reaction to accommodation is not present. Neither does it seem likely that alterations in the blood pressure are of any significance, for direct pressure upon the cornea does not cause the pupil to contract. Westphal, therefore, is compelled to believe with Bernhardt, that our knowledge of the association of the various nerve-tracts in the central nervous system is not sufficient to explain these various combined movements, but suggests the possibility that there is some connection between the cells of the facial nucleus that innervate the orbicularis oculi and those of the oculomotor nucleus that cause contraction of the iris.

One month later Piltz[1] published a paper, decorated with a long series of dates, with the object of showing that he had discovered this pupillary reflex some time before Westphal's publication. He first discovered it in the eyes of a case of general paresis with immobile pupils. When this patient was urged to close his eyes and then open them it was found that both pupils were in a state of marked contraction that lasted for an appreciable interval of time. When the same patient was directed to attempt to close the eyes against resistance, at the same time fixing some object, the pupils contracted still more vigorously. The application of homatropine, causing dilatation, or of eserine, causing contraction of the pupil, made the phenomenon disappear. As a result of this case Piltz made extensive investigations into the subject, testing the eyes of cases of general paresis, katatony, epilepsy, tabes dorsalis, blindness, and twenty-three healthy persons. He found the first reflex —that is, contraction of the pupils—after simple closure of the eyes, twenty-five times; nine of these patients had complete failure of reaction to light, ten had a slight reaction to light, and five a good reaction to light. It therefore follows that this reaction occurs chiefly in cases of interference with the light reflex, but not exclusively. The second reflex, simple narrowing of the pupils during an attempt to close the eyelids against resistance, occurred in forty-two of his series of cases; eleven of these had failure of reaction to light, twelve had slowly reacting pupils, and seventeen promptly reacting pupils. One case of general paresis with moderately dilated pupils that had failed to react to light

[1] Neurologisches Centralblatt, No. 6.

did not present the symptom. In one case of locomotor ataxia, blind as a result of optic atrophy, the reflex was consensual. In one case of complete oculomotor paresis with immobile pupils both reactions were present and prompt. Piltz calls attention to the fact that this phenomenon was suggested in Wundt's text-book as early as 1880, and was more completely described by Gifford in 1895, but neither communication appears to have attracted general attention.

In a paper published some time later Mingazzini[1] claimed priority of the discovery of this reaction for his colleague Galassi, who observed the reflex in 1887, and called it the eyelid reaction of the pupils. The first patient had immobility of the pupils; when she closed her eyes and then opened them the left pupil was found strongly contracted, and it also contracted when the eyelids were held apart and the patient attempted to close them. In a second case, in which this phenomenon occurred in the right eye, the autopsy revealed a chronic thickening in the extradural portion of the oculomotor nerve, apparently caused by a deformity in the dorsum sellæ and irritation by the right posterior clinoid process. Galassi's theory was that the phenomenon occurred as a result of associated muscular action, and gave the following explanation of its occurrence when the light and accommodation reflexes were lost, admitting that voluntary impulses may be transmitted through a degenerated nerve before merely reflex impulses. He supposes that the vigorous innervation of the orbicularis palpebrum is accompanied by irritation of the pupillary contracting centre in the oculomotor, causing narrowing of the pupil in cases in which, as his autopsy showed, the oculomotor is so degenerated that the ordinary impulses do not pass. In addition, he assumed a degenerated condition of the smooth muscle fibres of the pupillary sphincter, producing in them a state of exaggerated irritability. He was convinced that this probably occurred, and that the condition was progressive, because in the case in which the phenomenon was first observed by him, it diminished markedly in the course of time, probably as a result of further degeneration of the muscle. He also believed that this reaction was found occasionally in normal eyes. I have observed this reflex in a case of general paralysis in which, however, the light reflex was present.

The cortical reflex described by Piltz is interesting, because it proves that the activity of the higher psychical centres has an influence upon the size of the pupil, and may be exerted voluntarily. Of course, it has been known for a long time that in emotional states the pupils commonly dilate. Piltz[2] has shown that for the pupillary reflexes, as well as for the tendon reflexes, there are at least two arcs concerned—

[1] Neurologisches Centralbl., 1899, No. 11.

[2] Ibid., 1899, No. 1.

an upper and a lower one. The experiments were carried on in a variety of ways. The patient, who was placed in a moderately illuminated room, fixed a point upon the opposite wall, and then had placed at the periphery of the field of vision a bright and a dark object. Without changing the direction of his glance, he turned his attention alternately first to one and then to the other, and the observer noted that the pupils became narrower when the attention was directed to the bright object, and wider when it was directed to the dark object. Piltz then undertook to determine whether the mere imaginary presentation of a light or a dark object could have any influence upon the pupil, and found that when the subject was educated to the point of fixing his attention vigorously upon some such imaginary object the pupil underwent dilatation or contraction, according as the object was dark or light. These changes could not be due to circulatory disturbance, because the artificial production of alterations in the amount of blood in the iris had no effect whatever. In a subsequent paper[1] he repeated the latter series of experiments, and with a well-educated subject the results were invariably the same, and were not influenced by the distance of the fixation point, which varied from 20 cm. to infinity. In order to exclude any possible error, the observer and the subject registered simultaneously upon a moving drum, the former the actual alterations in the size of the pupils, the latter his subjective representations. Haab admits the conclusive nature of the proof of a higher reflex arc—that is, of fibres going from the cortex to the oculomotor nucleus—and Piltz believes that a discovery made a year ago by himself, that there exists in the cortex of the rabbit a centre for the unilateral contralateral contraction of the pupil, indicates the existence of such cortical fibres.

[1] Neurologisches Centralblatt, 1899, No. 11.

REVIEWS.

LECONS DE CLINIQUE CHIRURGICALE. Traites a L'hotel-Dieu. (LESSONS ON CLINICAL SURGERY.) Par PIERRE DELBET. Paris: G. Steinheil.

THIS volume contains twenty clinical lectures delivered at the Hôtel Dieu, lectures which treat most entertainingly and instructively of a great variety of subjects, and in which these subjects are presented in that clear, precise, and beautiful style which is characteristic of the writers of France. The following subjects are discussed: Uranoplasty, complications of otitis media, congenital thyro-hyoidean cysts, impassable stricture of the œsophagus, the diagnosis of incipient Pott's disease, fracture of the vertebral column, cirsoid aneurism, carpus curvus, retardation of the palmar aponeurosis, part played by valvular insufficiency in the internal saphenous vein in the production of varicose veins of the lower extremity, Dupuytren's fracture, intestinal obstruction produced by twisting of the mesentery, chronic and incomplete intestinal obstruction, treatment of hydatid cysts of the abdomen, appendicitis and salpingitis, and the treatment of appendicitis.

In cleft palate the author is opposed to a very late or a very early operation, and prefers to operate between the sixth and seventh year. He does not approve of the early operation, which is so strongly and to our mind so convincingly advocated by Edmund Owen. Owen maintains that if operation is delayed until the habit of imperfect speech is formed that the closure of the cleft will not correct the speech defect, a view which seems reasonable, to say the least. Delbet opposes operation during the second or third year, maintaining that in these early operations there is a greater mortality, no better, and possibly a worse, phonetic result, such failure being due to the extreme difficulty of operating in the very young, and the liability to subsequent maxillary atrophy. He approves of Le Dentu's dictum, that is, "I admit one could perform urano-staphylorraphy or staphylorraphy upon robust individuals, at a little more tender age than six or seven years, but I would not willingly risk doing it on a person of less than five years, or, at the extreme, four years of age." Delbet operates by the double bridge method of Diefenbach, and exactly follows the technique of Trélat.

In discussing otitis media he offers the following suggestive hint: If an individual, comatose or semi-comatose, is brought into the hospital, if you can obtain no accurate history of the patient, and can extract no information from him, think of the possibility of an auricular origin, and at once examine the ear. If it is of auricular origin you will often find a flow of pus from the ear—often, but not always, because in some cases the flow of pus ceases when the mastoiditis begins. This is because the swelling of the mucous membrane blocks the aditus. Hence, a dry ear does not prove that the origin of the condition is not

auditory. In such cases an otoscopical examination should be made, to see if there is a reddened or perforated tympanum. The following physical signs are significant in a comatose patient: Redness of the skin, bulging of the posterior superior wall of the external meatus, œdema of the skin in the retroauricular region. These signs, however, may be absent, and usually are absent in the initial stage. There is one sign which is never absent, and that is tenderness of the mastoid, and, as Schwartze has shown, pressure upon the mastoid may even arouse the patient momentarily from coma. The author discusses the complications of otitis media (brain abscess, Pott's abscess, meningitis, sinus thrombosis, and mastoiditis). In sinus thrombosis he believes in the ligation and division of the jugular vein if it can be carried out below the thrombosis.

In discussing stricture of the œsophagus he reminds us that the swallowing of corrosive fluid, as a rule, produces multiple stricture, and any operative procedure must be founded on this knowledge. He says, as a rule, but not always, a stricture impermeable from above can be passed from below after the performance of gastrotomy. If the patient is much weakened such a complex operation is not justifiable, and gastrostomy is to be preferred. If the œsophagus is opened above a stricture it may be found possible to pass a bougie by this route, although impossible by the mouth. Another method consists in opening the œsophagus above and also below the stricture, inserting a finger into the upper opening and a blunt-pointed bistoury into the lower opening, and dividing the constriction (Gussenbauer's combined œsophagotomies). We would prefer, if it can be used, the string saw of Abbé.

Delbet believes in forcible reduction in Pott's disease. He says there are three methods: (1) The ancient and simple plan of traction, etc.; (2) the bloody method; (3) Sayre's suspension. He considers the first plan the best, and says the hopes of the advocates of laminectomy have not been realized.

He considers that the only real treatment for cirsoid aneurism is extirpation of the tumor. Injections of coagulating fluids is dangerous and ligation of afferent vessels useless.

In carpus curvus the dislocation is secondary, and attempts at reduction are bound to fail. It is necessary to break the curved radius before it can be straightened (osteoclasis or, preferably, osteotomy).

The author believes that retraction of the palmar aponeurosis is due to trophic disturbances. He believes in early treatment, and after operation employs massage and gymnastic exercises. He favors Goyraud's or Busch's operation.

Delbet makes a convincing argument to prove that incompetent valves in the internal saphenous vein cause varicosities in the leg. The incompetence permits increase of tension in the vein, venules, and capillaries when the patient is upright or when he walks. The pressure changes each instant, and at times is equal to or above that in the capillaries. The nutrition of the skin and subcutaneous tissues becomes much impaired. Blood from the saphenous is deviated into the deeper vessels, and reaches the popliteal and femoral veins, and some of this blood flows back into the saphenous from the femoral (vicious circle of Trendelenburg); hence the blood may actually flow in the wrong direction in the saphenous vein.

The author discusses the cause of appendicitis, and maintains that

the closure of the lumen at some point is the result rather than the cause of the disease. He points out the chief points in making a diagnosis between appendicitis and salpingitis, and reminds us that both conditions may exist in a woman at the same time. Delbet inveighs against the importance some writers attach to McBurney's point. It is interesting to note that the author does *not* operate upon every case.

In the above remarks we have endeavored to give in a very sketchy manner some of Delbet's views upon various controverted points. These few remarks cannot do justice to this truly excellent book. It is one which all surgeons can read with interest and with profit.

J. C. Da C.

Saunders' Medical Hand Atlases. Diseases of the Skin. By Prof. Dr. Franz Mracek, of Vienna. Edited by Henry W. Stelwagon, M.D., Ph.D. Philadelphia: W. B. Saunders, 1899.

To the student or practitioner of medicine who may wish to pursue a course in dermatology, and to whom clinical opportunities are lacking, this little book will be extremely valuable. There are numerous men who may wish to increase their knowledge of cutaneous diseases, but cannot find time to take a course at some skin clinic, and therefore the personal inspection of cases is denied to them. As in the study of osteology bones are essential, so also in the study of diseases of the integument one needs to have cases presented for his inspection, and he also requires more—he needs some one to teach him what to look for in each individual case, and how to see it. In dermatology looking and seeing are entirely different. The great Hebra, the father of modern dermatology, said a man should be able to make a diagnosis in diseases of the skin from what he sees alone. As this book presents numerous well-prepared plates, and the text tells one what to look for, it is, therefore, we consider, both the "bones to the osteologist" and a teacher.

There are already many atlases and text-books on dermatology, some better fitted than this to one who already has acquired a general knowledge of diseases of the skin, or who wishes to become or is a specialist—books and atlases which go into details and deal with all the rare and unique cases. This hand-book, we take it, was not written for them but for two great classes—the general practitioner and the student of medicine.

In comparing it to the well-known atlases, it has, we think, many distinct advantages. *Duhring's Atlas*, which we always considered the best of any, dealing, as it does, with types of disease, is unfortunately out of print, and therefore very expensive or unattainable. Only the commoner diseases are depicted in this atlas, so that to-day, in our best medical schools, where the study of dermatology is compulsory, the student on graduation is usually competent to diagnose the cases illustrated in that atlas.

Crocker's Atlas is very expensive, very bulky, and in numerous parts. The coloring in many of the plates is too blue or too brown, and, therefore, misleading on that account.

The *Saint Louis Hospital Atlas*, of Paris, is expensive, and the plates

are made after models taken from living or dead cases. This is also a large and bulky atlas in numerous parts.

Fox's Atlas gives pictures made from photographs, and photographic plates do not show some cases of skin diseases to advantage. This also is a large and cumbersome book.

Therefore, the advantages which we see in this little book, and which recommend it to our mind, are: First, its handiness, on account of the size—7 by 4 inches; one can keep such a book on his table or in the book-case, and turn to it for reference in an instant. Secondly, the plates, which are, as a rule, most excellent, and occupy the whole page on which they are printed; there is no large blank margin, which usually weighs down the ordinary atlas so much. Thirdly, the vast majority of the plates are excellent as regards drawing, color, and the diagnostic points which they bring out. For example, Plate V, of varicella, shows that the lesions may be umbilicated, although such a careful observer and thorough teacher as Dr. Osler says in his book "there is no umbilication as in the vesicles of smallpox" (*Practice of Medicine*, 1892, p. 66), whereas all dermatologists know that umbilicated lesions may and do exist in varicella, as this plate most faithfully depicts. Fourthly, we can recommend the book because of the author's and publisher's selection of their American editor, Prof. Stelwagon, a writer of note, a careful and competent observer, one who has been a teacher for years, and one who knows the requirements and needs of the student of dermatology. We are pleased to note the editor has parenthetically added his own or the American view of this or that different disease, or the treatment of the same. For example, page 68, "acute contagious pemphigus" of the Austrian school is "an example of an anomalous form of impetigo contagiosa," and, page 180, "herpes tonsurans disseminatus" is "pityriasis maculata et circinata." Lastly, we recommend it becasue of the price, which is within the limit of *all*.

While there is much to praise, some of the plates are misleading, and the volume has its shortcomings. Plate XXXI, sycosis (?), we think depicts better tinea sycosis, as *all* the hairs have fallen out, as occurs in the parasitic variety. While this disease *may* occur on the upper lip, it rarely does, and the text here says "which (hairs) may be quite easily and painlessly pulled out." No mention is made of a microscopical examination for the tricophyton fungus or the differential diagnostic value of the same when considering sycosis vulgaris and tinea sycosis. Plate XXXII, furunculosis, looks more like that clinical entity ecthyma. Plate XXXIX, ichthyosis, is too inflammatory; it is evidently an ichthyosis associated with eczema. Plate LI, tuberculosis verrucosa cutis, lacks the violaceous tint.

In the text we note that eczema has only twelve pages for its definition, diagnosis, etiology, prognosis, and treatment. As eczema includes 35 per cent. of all diseases of the skin, we think it is at least entitled to a better definition than "an inflammatory affection of the skin accompanied by the subjective symptoms of itching and burning." Such a definition would apply to nearly all inflammatory diseases of the skin. Its clinical forms should be more fully described. The continued use of soap and water we note is not contraindicated in the treatment.

We are much pleased to note that the author makes a group of tuberculous diseases of the skin under five clinical forms.

Taken, therefore, as a whole, we congratulate the author, the editor,

and the publisher for giving to the medical profession this neat and handy book, and we most heartily recommend it to all who wish to study dermatology, and have at hand for ready reference sixty-three colored plates and thirty-nine half-tone illustrations of cutaneous diseases, which, for the most part, are excellent. C. N. D.

VIERORDT'S MEDICAL DIAGNOSIS. A CLINICAL TEXT-BOOK OF MEDICINE FOR PHYSICIANS AND STUDENTS BASED ON THE MOST RECENT METHODS OF EXAMINATION. By OSWALD VIERORDT, M.D., Professor of Medicine at the University of Heidelberg, etc. Authorized Translation with Additions by FRANCIS H. STUART, A.M., M.D. Fourth American edition from the fifth German, revised and enlarged. Philadelphia: W. B. Saunders.

PRACTICAL DIAGNOSIS. THE USE OF SYMPTOMS IN THE DIAGNOSIS OF DISEASE. Fourth edition, revised and enlarged by HOBART AMORY HARE, M,D., etc. Pp. 631. Illustrated with 205 engravings and 14 colored plates. Philadelphia and New York: Lea Brothers & Co., 1899.

THE fourth American edition of Vierordt's excellent work calls for little notice beyond what has been said before. It is a good-sized volume of 603 pages, with many good illustrations and diagrams. It has been translated into clear and simple language. That part of the work dealing with physical examination, properly speaking, is very clear, concise, and good. While the general standard of the book is high, two sections, however, leave much to be desired. So important a question as the serum diagnosis of typhoid fever is treated of in a brief note of but twenty lines added by the translator, while the section upon the malarial parasite is not only incomplete but inaccurate. Statements such as "The parasite is found at the time of the fever or its appearance in the blood precedes the fever" are misleading; while the statement that "At the same time with the malarial parasites there is a moderate leucocytosis" is inaccurate.

In other respects, however, the work will hold its place as one of the most valuable and creditable treatises of its kind.

The rapidity with which successive editions of Hare's excellent work on *Practical Diagnosis* have appeared is evidence of its real and practical value. The fourth edition forms a handsomely bound volume of 631 pages. The work, as is well known, is more concise and less discursive than most foreign publications upon the subject, a fact which has its advantages and disadvantages; the author has, however, been happily consistent in this respect throughout the book. The language and descriptions are clear and direct, and the subject-matter has been brought well up to the time of publication. Thus, in this last edition, such facts as the diagnostic importance of eosinophilia in trichinosis have been judiciously noted. The diagram of Baas, illustrating the paths of the pupillary reflex, has been added, as well as several new illustrations. Some of the descriptions of disease pictures are particularly clear and good; such are those of pneumonia and pleurisy in the

section on diseases of the thorax. The section upon "The Manifestation of Disease by Symptoms" contains also many valuable suggestions.

Upon the general excellence of the work it is unnecessary again to insist. Its very merit, however, justifies a few minor criticisms or suggestions.

On page 292, the author, while noting the value of Rotch's sign of pericardial effusion, judiciously states that he has observed the same manifestation in marked cardiac dilatation, but fails to mention the valuable observation of Ewart, that it is not so much the presence of flatness in the fifth right space, which is of importance in the diagnosis of pericardial effusion, as the association of this sign with the obliteration of the normal acute angle between the right border of cardiac dulness and the line of liver flatness—a point which the reviewer has in a number of instances been able to verify.

The assumption, on page 318, that a cardiac murmur in the absence of anæmia is a sign of organic cardiac disease, unless it be cardio-pulmonary in nature, would appear to be rather too positive.

The consideration of Widal's test in typhoid fever and the section upon worms might, perhaps, be a trifle fuller.

On pages 61 and 62 Heberden's nodosities appear to be erroneously attributed to gouty deposits, a mistake which seems to be firmly rooted in literature.

On page 380, line 17, the word "plain" is doubtless a misprint for "pale" or "palely."

In one respect the work is cerainly the best of its kind—namely, its excellent illustrations. These are abundant and well chosen. In selecting the best cuts from literature, Dr. Hare has wisely avoided a prevalent tendency to sacrifice excellence for originality. The work is handomely printed and bound. W. S. T.

LEITFADEN DER ELECTRODIAGNOSTIK UND ELECTROTHERAPIE FÜR PRAKTIKER UND STUDIERENDE. (INTRODUCTION TO ELECTRO-DIAGNOSIS AND ELECTRO-THERAPY FOR THE PRACTITIONER AND STUDENT) By TOBY COHN, with preface by PROF. DR. E MENDEL. Berlin, 1899.

THIS is an elementary treatise upon a branch of therapeutics and diagnosis that is too frequently undertaken without adequate preparation or sufficient knowledge. As such a treatise, dealing only with the essential elements of the subject, it is one of the best that it has been our fortune to read. The material is systematically and logically arranged, the style is clear, and the statements are precise, but not so dogmatically positive as to lead the reader to believe that, having read and absorbed them, there is no other knowledge for him to seek. The book, moreover, trenches not infrequently upon some of the less well-known branches of electricity as applied to medicine. The physiological section is very excellent, much better than ordinarily found in the best text-books of nervous diseases, and yet so clearly stated that it is not beyond the comprehension of the ordinary medical student. Cohn is an exceedingly cautious writer, and when he has occasion to deal in

theory usually adds a foot-note in which he apologizes for any possible inaccuracy of his statements; thus, in discussing the reasons for the occasional absence of the reactions of degeneration in cases of chronic progressive spinal muscular atrophy, which he explains by assuming the degeneration of isolated fibres in the muscle, the others remaining normal, he admits that many will fail to agree with his view, reasonable as it seems to be. The discussion of the reaction of degeneration and its significance is clear and thorough. The conditions in which the reaction occurs are discriminated from those in which it does not. The border-line cases—that is, those of progressive muscular dystrophy with the reaction—puzzle him as much as the rest of us, and he merely states that perhaps all the so-called idiopathic muscular dystrophies do not belong absolutely to that group. In reading this chapter, as in reading similar sections in other books, we have felt that the reaction of degeneration was made too complicated, and that there was too great a subdivision into types not sufficiently distinct from one another. Cohn, for example, recognizes the mild and severe forms of the complete reaction, and, in addition, a partial reaction, but finds as the only distinction between this and the mild form of complete reaction the occasional absence of quantitative alterations to Faradism. In addition to these three varieties we have also the faradic reaction of degeneration, characterized by a sluggish twitching of the muscle, the myotonic reaction, and the myesthenic reaction. The section on electro-cutaneous sensibility is not up to the standard of the rest of the work. The subject is treated carelessly and rather indefinitely. This, we believe, is a branch that will be of increasing value in the diagnosis of diseases by electricity. Not infrequently we have been able to detect marked dissociation of sensation, in which at times the pain and electric sensations were absent or blunted, while tactile sense remained intact. In one case the electro-cutaneous sensation was alone affected, all other forms of sensation remaining normal. The chapter on the resistance offered by the body to electric currents is very satisfactory. This is a subject to which too little attention has been paid in the ordinary works on electro-therapeutics. Cohn discusses it very thoroughly, including the method for measuring the resistance of the skin, both at the beginning of the application of the electrode and after it has become relatively constant. He does not, however, pay enough attention to the pathological significance of this phenomenon, and fails to mention, indeed, that cases occur in which the electro-cutaneous resistance seems to be abnormally or temporarily increased without apparent anatomical alteration of the parts. Being a true German, he devotes ninety pages to diagnosis and twenty-eight to therapeutics. In his introduction to the latter part, he takes occasion to pay his respects to those authors who deny the therapeutical value of electricity, and also to those who ascribe its effects entirely to suggestion. Should this latter theory be true, he argues, it would be absolutely useless to pay any attention to the kind of current employed, or to the mode of its application. When, however, he attempts to justify his own opinion that electricity is of direct therapeutic value, he is compelled to fall back upon comparative studies which show that certain curable affections recovered more rapidly under the application of electricity than otherwise; upon practical experience, which means practically nothing at all, and upon the *à priori* argument that electricity, which has produced such decided physical effects, ought, therefore, to

have some specific action upon the diseased nervous system. We do not wish to criticise Cohn's aguments too severely, but they illustrate too forcibly how totally ignorant we are of the whole action of this agent, for it can be fairly stated that at present it is imposible to be certain whether it is the mere mechanical contraction of the muscle, or some specific action upon the trophic fibres in the nerve, or some chemical action upon the tissues themselves, if it be any action at all, that produces the beneficial effects. Aside, then, from the knowledge obtained from physiological experiments that the positive pole is the nerve-depressor, the negative pole the nerve-excitant, we are compelled to fall back, apparently, as Cohn admits, upon empirical experience. In the practical application of galvanic current, Cohn believes explicitly in the constant use of the galvanometer, a point that is often unfortunately too much neglected. Otherwise, he describes nothing particularly new. In cases of localized lesion in an accessible nerve he claims to have produced excellent results by passing ascending constant currents through the nerve. He warns particularly against the employment of Faradism when the pseudoparalytic myesthenic reaction is present. In the treatment of the disease of the spinal cord and of the brain, he mentions the methods of passing or attempting to pass constant currents through these organs. It is obvious to any one that the likelihood of getting an electric current through the spinal cord by placing one electrode on the neck and the other in the lumbar region is very faint, although Cohn believes that some of the deviated currents do affect the medulla spinalis. As to whether they do any good he is highly skeptical. At any rate, he believes that they are not to be used when acute processes are present. In regard to constant currents through the brain he is even more positive, and we gather from his statements that he never uses them, and rather disapproves of their use by others. The local application of electricity to the internal organs he believes to be useless and highly dangerous. Therefore, he discountenances the urethral and gastric electrodes. He is also rather skeptical of the benefit of the various artificial methods employed chiefly with a view of their suggestive qualities, such as the electric hand. In cases of hysterical paralysis, however, he believes that sometimes cure may be obtained at a single sitting by using, simultaneously with suggestion, rather strong faradic cutaneous stimulation. At the conclusion of the book are two chapters, one dealing with various forms of electrical apparatus and the other with Franklinization. Of the latter, after the description of the various varieties of applications, he has only to say that electro-diagnostic attempts hitherto made have not yet led to definite conclusions. In one respect Cohn is to be heartily congratulated. He appears to have accomplished the impossible, and to have devised a form of illustration which shows, even more satisfactorily than those first published by Erb, now copied in almost every text-book, the points of application of the electrodes for the purpose of stimulating the various nerves and muscles of the body. Briefly, these illustrations consist of an anatomical plate, upon which the muscles and nerves are shown, and a translucent leaf folded over this, upon which is printed the external appearance of the part, with red dots indicating the points for the application of the electrodes. As far as we know this is a distinctly original method of illustrating this subject, and very much more artistic than those hitherto employed. J. S.

TRAITÉ PRACTIQUE DE RADIOGRAPHIE ET RADIOSCOPIE, TECHNIQUE ET APPLICATIONS MÉDICALES. By A. LONDE, Directeur du Service photographique et radiographique a la Salpêtrière. Paris: Gauthier-Villars, Imprimeur-Libraire, 1898.

THE author of this work is not a physician, and has, therefore, naturally devoted himself more to the technique of the subject than to the medical side. He describes well and at length, and shows by excellent illustrations many forms of apparatus, such as vacuum pumps, a great variety of Crooke's tubes, appliances for X-ray work and the method for their use. To this part of the subject more than half the volume is devoted. In the addenda a description is given of a Crooke's tube, with a vacuum regulator similar to the one devised by Dr. W. H. Rollins, but the writer lowers the vacuum in the tube by heating the regulator, as Dr. Rollins formerly did, until the latter found the better way of lowering the vacuum by means of the electric current; this means is more accurate, and by it the vacuum may be lowered to the exact point desired. A comparatively short portion of the book is given to the various surgical and medical uses of X-ray photography, such as the study of the formation of the skeleton at different ages and congenital malformation; the value of the radiograph in myxœdema as an aid in diagnosis, and in the opportunity it gives to observe the improving effects of the treatment, is considered. This book presents the technique of X-ray work more fully and better than anything thus far published.

This and Regnier's book on X-rays are two among many on the subject that have appeared during the past two years, and they indicate the development of this method of examination, which is in daily use in many of the large hospitals of the world, and are in themselves the immediate result of work done in two hospitals in Paris—La Charité and La Salpêtrière. Since the discovery of the X-rays many minds have been directed toward their adaptation to surgical and to a less extent to medical diagnosis, and in the United States especially much has been done to overcome the obstacles to their practical application.

F. H. W.

RADIOSCOPIE ET RADIOGRAPHIE CLINIQUE. By L. REGNIER, M.D., Chef de Laboratoire d'Electrotherapie et de Radiographie de l'Hôpital de la Charité. Paris: J. B. Ballière et Fils, 1899.

IN the introduction to this small book the writer gives a brief history of the X-rays, in which the discoveries of both Lénard and Röntgen are recognized. In the book itself various forms of apparatus are well, though briefly, described, and their method of use indicated. The clinical applications of the X-rays are well outlined, and that part of the work relating to the medical uses of these rays is especially emphasized. Their aid, for example, in diseases of the lungs and heart and of the large vessels is discussed; and the distinction made between gout and rheumatism is also considered. Under obstetrical uses the author shows how pelvic deformities may be recognized, and he also cites a case of extra-uterine pregnancy in which the diagnosis was made by means of a

radiograph. In short, this book indicates briefly the scope of this new method of examination, and is for its size one of the best that has been written. F. H. W.

AN ESSAY ON THE NATURE AND THE CONSEQUENCES OF ANOMALIES OF REFRACTION. By F. C. DONDERS, M.D., late Professor of Physiology and Ophthalmology in the University of Utrecht. Revised and edited by CHARLES A. OLIVER, A.M., M.D. With portrait and other illustrations. 8vo., pp. 81. Philadelphia: P. Blakiston's Son & Co.

THE editor has embodied in this work in a series of paragraphs the gist of Donder's extensive treatises upon optics and ophthalmology. The book is presented in an attractive form, and will serve to recall the teachings of the great Dutch master. W. C. P.

SAUNDERS' MEDICAL HAND ATLASES. EXTERNAL DISEASES OF THE EYE, INCLUDING A BRIEF TREATISE ON THE PATHOLOGY AND TREATMENT. By PROF. DR. O. HAAB, of Zurich. Edited by GEORGE E. DE SCHWEINITZ, A.M., M.D. With 76 colored plates and 6 engravings. Philadelphia: W. B. Saunders, 1899.

THIS volume is quite up to the high standard which has been set by other numbers of the series of hand atlases which have already appeared. The illustrations are excellent, and the book is offered at such a low price that every student has it within his reach to possess a work which will be an excellent substitute in the absence of clinical material, and a good guide for comparison in studying cases where the diagnosis is in doubt. The work is not a text-book on ophthalmology, but when employed in the manner which has just been indicated it will be found of great value. The reviewer heartily recommends it to all students of ophthalmology. W. C. P.

A MANUAL OF DISEASES OF THE NERVOUS SYSTEM. By Sir W. R. GOWERS, M.D., F.R.C.P., F.R.S. Edited by JAMES TAYLOR, M.A., M.D., F.R.C.P. Third edition, Vol. I. Philadelphia: P. Blakiston's Son & Co., 1899.

THE third edition of this standard text-book of nervous diseases comes to us with a reputation unequalled, perhaps, by any other work in the field of neurology. In recommending it as a text-book to their students, the universities of the continent have paid it an honor which but few translations from English ever receive.

The influence of Taylor, whose name as editor appears in this edition for the first time, is seen in every chapter of the book. That portion of the work concerned in the anatomy and physiology of the ganglion cell is especially praiseworthy. The newer investigations into the finer anatomy of the axis-cylinder and its primitive fibrils are recorded with perhaps not as much credit accorded to the epoch-making studies of Apáthy as they deserve.

If there be room for criticism in connection with the work it is that the illustrations do not come up to the standard of the rest of the work. An appendix by Batten on the anatomy and pathology of the muscle spindle completes the volume. D. J. McC.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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PROFESSOR OF MEDICINE IN THE JOHNS HOPKINS UNIVERSITY, BALTIMORE, MARYLAND,

AND

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PROFESSOR OF MEDICINE IN THE UNIVERSITY OF MICHIGAN.

Bilateral Swelling of the Submaxillary Salivary Glands in Typhoid Fever, without Enlargement of the Parotids.—MILTON MILLER (*The University Medical Magazine*, July, 1899) reports a case with this unusual sequela on the twenty-seventh day of the disease, two days after normal temperature had been reached. The painful swelling of the left gland was succeeded in three to four days by a similar condition in the right. A rise of temperature to 102° was observed; resolution without suppuration took place, and in two weeks no swelling was visible.

Miller was able to find but one similar instance, Hoffmann (Leipzig, 1869) reporting a case ending in suppuration of the left submaxillary gland.

In the medical clinic at the Johns Hopkins Hospital suppuration of both glands was observed this year in a colored boy rather late in the disease; streptococci were the only organisms present.

The Role of the Meningococcus in Meningitis.—NETTER (*Societe de Biologie*, June 17, 1899), reporting twelve cases of cerebro-spinal meningitis in which the meningococcus or diplococcus intracellularis meningitidis was found, apparently still adheres to his views expressed in the *Twentieth Century Practice*. The accepted view of the epidemicity of the disease caused by this organism is not recognized by this observer. Chantemesse, opposing Netter, speaks for the recognition of the epidemic nature and specific character of the meningitides associated with meningitis. Netter's ideas that the meningococcus is a derivative and degenerate form of the pneumococcus seems to Chantmesse quite erroneous.

Griffon identifies one organism of Netter's "the streptococcus derived from the pneumonoccus" as the "streptococcus meningitidis of Bonome."

Etiology and Diagnosis of Cerebro-spinal Fever (*Lancet*, June 24th). In the Cavendish lecture for 1899, OSLER speaks of epidemic cerebro-spinal meningitis as a disease to be distinctly differentiated from other well-recognized primary and secondary meningitides. The epidemic features of the disease and its bacteriology are first discussed. Netter's rather remarkable and illogical conclusions are strongly objected to. In the diagnosis the sudden onset, the irregular style of fever, skin eruptions—herpetiform and petechial—leucocytosis, and arthritides are given prominence; the value of Kernig's sign in the recognition of meningitis and the great diagnostic worth of Quincke's lumbar puncture are considered; no distinct therapeutic results are ascribed to the latter.

In thirteen of fourteen cases in which lumbar puncture was performed at the Johns Hopkins Hospital the specific organism was demonstrated; large amounts of turbid or bloody fluid were frequently obtained—as much as 126 c.c. on one occasion. At times clear fluid may be found.

Sporadic meningitides, according to Osler, may be due to the meningococcus or to the diplococcus pneumonia, which may be a primary or secondary infecting agent.

Morphine, ice-sponging, frequent lumbar punctures whenever symptoms of pressure from accumulation of fluid appeared, formed the main line of treatment. Laminectomy and draining of the cord were undertaken in two cases in Dr. Osler's wards with no very marked results.

Pleurisies Due to the Bacillus Eberth.—Pleurisies caused by the typhoid bacillus may be serous or hemorrhagic, but according to Labiche are most often purulent, occurring most frequently during convalescence; they may exist independently of lesions in the lungs, although bronchopneumonia and bronchitis frequently precede. The physical signs are those of most pleurisies; the temperature is not to be considered as a guide to the local condition, pleural and hemorrhagic pleurisies existing with little or no fever. These typhoid pleurisies may be of quite long duration—in one case eighty days; they may resolve, or thoracentesis or an operation for empyema may be necessary.

LABICHE considers the prognosis serious, and advises frequent exploratory punctures, in order to observe the nature of the fluid. The cold bath has no share in the production of the pleurisy, and is not contraindicated should pleurisy develop; ultimate resolution depends upon general amelioration of the patient's condition. Operation or thoracentesis are only to be resorted to should the symptoms become intensified, since even purulent exudate may completely resolve.—*Gazette Hebdom.*, 1899, No. 17.

Acute Myocarditis.—RENAUT describes acute myocarditis produced experimentally in animals by inoculation of toxins of diphtheria, as showing, first, granular degeneration of the cardiac muscle cell with disappearance of the transverse striation and a colloidal-like transformation of the smooth, muscular coat of the smaller arteries. Subsequent lesions are seen as areas of disintegration and vacuolization of the heart muscle fibres, and slight infiltration of the connective tissue. The process, as a whole, may be called an acute parenchymatous myocarditis. Myocarditis, due to diphtheria toxin,

in the human subject is practically identical with the experimental disease; the myocarditis in typhoid fever is of a much less severe type; that seen in pneumonia resembling closely that of typhoid, but shows no "congestive œdema" of the myocardium. In all the same alterations of the small arteries is seen. Either the toxins of these organisms or the presence of the organisms themselves may be responsible for the changes found, the Eberth bacillus and the pneumococcus having been frequently found in lesions. The symptomatology of the development of myocarditides is very similar in all; at onset there may be seen a short period of cardiac excitation, rapid, strong pulse, of good tension, and strong pericardial shock; then ensues a gradual weakening of pulse, with loss of tension, and a vague undulation in place of previous cardiac shock, tachycardia and other disturbances of rhythm being associated. Myocardial lesions which are exclusively parenchymatous have no distinct clinical history; the interstitial affections, according to Renaut, have a "fine and definite symptomatology"; these develop always in convalescence, usually when the first movements are made. Extreme weakness, often vomiting and diarrhœa, and, on the part of the heart, tachycardia and arrythmia are seen, disappearing if the process does not become more marked, but in the event of its aggravation a true acute asystole may occur.

Suppurative myocarditis may resemble ulcerative endocarditis in its symptomatology, with its embolic and general phenomena; intense præcordial pain may be present, radiating to back and abdomen; syncopal tendencies occur.

Renaut also describes a parenchymatous acute myocarditis of infants, differing greatly from other forms. This form is an acute or subacute myocarditis, developing in the course of rheumatism, erysipelas, or typhoid, especially in children already the subjects of valvular disease. Suddenly, in the course or termination of the disease, signs of myocardial weakness appear, but therewith no arrythmia, no "bruit de galop"; though usually fatal, there may exist a less severe, curable form.

Whether complete resolution of an acute myocarditis can take place seems doubtful; in animals one and two years after experimental inoculations, distinct evidences of former trouble could be made out.

Diagnosis rests upon the previously mentioned symptoms; treatment should be to quiet the preliminary excitation, if present, to sustain the heart and to relieve arterial tension.—*Pressé Med.*, July 29, 1899.

Osteo-arthritis of the Spine; Spondylitis Deformans.—GOLDTHWAIT, reviewing the literature on this subject, and reporting ten cases with illustrations, insists first upon differentiating spondylitis deformans from other types of rheumatoid disease, chronic in character and leading to joint ankylosis, but in which there is atrophy of all the joint structures, with no tendency to nodular growth or caseous deposit.

Spondylitis deformans is a disease of adult age, not necessarily old age, some cases developing in late adolescence; its etiology is not clear; gonorrhœa is given by some as the probable cause; in a majority of cases a history of exposure is found.

Goldthwait refers to Bland Sutton's observations illustrating the disease in an Egyptian mummy, and to Sutton's reports of the same disease in cattle, as evidence of its long standing and wide distribution. The pathology of

the disease consists in nodular enlargement of the edges of the articular cartilages, with subsequent ossification of the nodes and extension of the process into the ligaments adjoining. With the hypertrophy at the edges of the cartilages there is atrophy of their centres or areas of pressure.

In the spine the process usually begins at one side anteriorly, and extends up or down along the anterior lateral ligament; it may remain localized here, or may spread up, down, or across. With the progression of the disease the intervertebral substances atrophy, causing often the rounding of the back; if the vertebræ are ankylosed before complete atrophy of the intervertebral disk, a straight back may remain.

Similar changes take place about the transverse and occasionally the spinous processes, giving rise to the symptoms of paralysis or disturbed sensation by narrowing the various foramina.

In proportion to the changes found, the clinical symptoms are slight; pain in the back, stiffness, rigidity, limitation of movement being chiefly complained of. In the event of the ribs becoming involved, the thorax becomes fixed, and respiration may be entirely diaphragmatic.

The diagnosis of Pott's disease may be difficult in the early stages, particularly if there is prominence of the affected part, neuralgic pains, disturbances of sensation, and paralysis may be present, resulting from pressure; rarely are the two sides of the body, however, affected alike, differing thus from Pott's disease; the paralysis is also peripheral in type—not central, as is usual in the latter disease. The resulting deformity has a wide range of variation; lateral deformity is rare.

Treatment should be nourishing and strengthening. The ordinary rheumatic remedies are to be avoided. Stimulation, bathing, electricity, and massage may give relief, and some mechanical supports prevent progressive deformity.—*Boston Medical and Surgical Journal*, August 10, 1899.

Characteristics of Blood-serum in Certain Varieties of Purpura Hemorrhagica (*Societe de Biologie*, July 1). In five cases of purpura, including purpura hemorrhagica, rheumatic purpura, and purpura occurring in cancer and tuberculosis, SICARD makes the following observations: "Coagulation of the blood taken from veins in large quantities (10 to 15 c.cm.) occurred within normal limits; on the other hand, the retraction of the clot and exudation of serum took place with the blood of one case only—the blood of the tuberculous patient with purpura—the other specimen of blood producing but ten to twelve drops of serum.

"Of more importance and interest is the fact that this serum exuded in such small quantities has not the power of rendering coagulable a liquid not spontaneously coagulable, as, for example, certain hydrocele fluids. Normal sera added to such fluids in proportion of 1 to 80 will, according to Sicard, induce coagulation in four to six hours. The sera of two cases of purpura hemorrhagica were absolutely devoid of this quality; that of rheumatic purpura and cachectic purpura showed minute traces, while the serum of the tuberculous case reacted like normal sera.

"Calcium chloride in minute quantities added to the blood of the purpura hemorrhagica cases produced rapid retraction of the clot and sera, which showed reaction of normal serum in a more or less complete fashion."

Sicard suggests that in the serum of certain purpuras the fibrin ferment, or its zymogen, is not present in sufficient quantity to cause more than simple coagulation of the blood. The subsequent retraction of the clots may be due to another variety of fibrin, the zymogen of which is absent in purpura.

The Symptomatology of Tumors Involving the Hypophysis Cerebri.—STEWART (*Montreal Medical Journal*, June, 1899), in introducing this subject, remarks that there are on record a number of cases of tumors involving the destruction of the hypophysis where no symptoms of acromegaly were present. Stewart presents two cases, in one of which the symptoms were those of a rapid, infiltrating neoplasm of the anterior part of the base of the brain. In the second, in addition to signs of direct cerebral pressure, there were symptoms suggesting pernicious anæmia and myxœdema.

The first case was admitted complaining of dimness of vision, headache in temporal and parietal regions, and occasional vomiting. On examination the outer half of the field of vision in the right eye was gone. Light perception was reduced in both eyes, and simple atrophy of both nerves was found; the optic atrophy progressed. The urine contained albumin and casts. Death occurred in a month. After development of continuous headache and later stupor, a bloody discharge from the anterior and posterior nares was observed during the last few days. At autopsy the sella turcica was found occupied by a lobulated tumor mass, 5 cm. by 4.75 cm. No trace of pituitary body was to be seen. The tumor had eroded the body of the sphenoid, and on the left side passed along the lesser wing of the sphenoid to the back of the orbit; it was pressing upon and had flattened the optic commissure. The pathological report classifies the tumor as a perithelial angiosarcoma of the pituitary body. Extensive degeneration of the optic nerves was found. There were cirrhotic changes in the kidneys, uterus, and ovaries, to which changes, in connection with hypophyseal growth, Stewart calls special attention. During life there were no symptoms of acromegaly or of anæmia.

In the second case, a man of forty-two years came under observation complaining of failing vision and headache; there had been vomiting of cerebral character some time previous. The patient had giddy sensations and tendency to fall forward.

On examination no perception of light was found in the left eye; the pupil was immobile, but reacted on stimulation of the right eye with light. In the right eye complete blindness to the outer side of the field; inner side amblyotic. Both optic disks were affected, the left showing white atrophy, the right being merely pale.

There were no objective disturbances of sensation or motion; the patient complained, however, of numbness of the hands and profuse perspiration about the head and neck. The subsequent course of the case was very slow; sight failed completely in a year and a half; the patient became very fat and anæmic; the face and extremities were puffy, but would not pit on pressure, resembling myxœdema. Four years from the date of the first observation the condition resembled pernicious anæmia, the blood-count being as low as 2,100,000, and a typical lemon tint had developed in the skin. Slow cerebration; hallucinations of sight, smell, and hearing developed in the next two years, and after six years of the above symptoms the patient died.

Tumor of the optic chiasm was diagnosed. Autopsy showed a large tumor of the pituitary body, extending more to the left than to the right; the surrounding bones were atrophied. Histologically the tumor was endothelioma. The thyroid was normal.

The combination of the myxœdematous condition and pallor of the skin in connection with the pituitary tumor are emphasized by Stewart.

Pechkranz, of Warsaw, in a case of sarcoma of the pituitary, mentions as a prominent feature a myxœdematous condition of the patient, considering it identical with pachacria mollis of Arnold.

Anders reports a case of hemorrhagic tumor of the pituitary and infundibulum in a case of pernicious anæmia, with symptoms of giddiness, headache, nausea, loss of consciousness, and delirium.

Notes on Two Hundred and Fifteen Cases of Typhoid Fever.—Bosanquet's (*British Medical Journal*, July 18, 1899) reports show that in the eight years from 1890 to 1898 the last four months of the year brought in 150 cases, there being 47 in October alone.

Onset with definite rigor was recorded in 5 cases; in 2 convulsions ushered in the attack; troublesome diarrhœa and obstinate vomiting were met with in 22 and 15 cases, respectively.

In 42 instances the spleen was palpable; hemorrhage from the bowel occurred in 21 cases (once as late as the fifty-seventh day of the disease); 12 cases in which perforation was seen ended fatally. Ten cases were complicated with pneumonia; 3 with pleurisy, acute nephritis, and arthritis, respectively. Under affections of the nervous system 2 cases of peripheral neuritis (paralysis and foot-drop) developed late in the illness. Among cardio-vascular accidents are mentioned 6 cases of thrombosis of the femoral vein—one of the pulmonary artery and one instance of embolus of the right iliac artery, causing fatal gangrene of the leg; cerebral meningitis was found in one fatal case. Sixty-eight per cent. of the cases showed typical roseola. In one case urticarial wheals were present.

Relapses occurred in 59 cases, once after twenty-six days of apyrexia; periostitis was met with as a sequela in three instances, once, however, on the twenty-fourth day. Forty cases ended fatally, a mortality of 18.5 per cent. There were 14 deaths from perforation, 3 of which were multiple; one perforation was of the large intestine. In 21 instances lesions were present in large intestines, extending to the rectum in 3, and affecting the appendix in the same number of cases. One instance each of ulcer in the larynx and in the stomach is recorded.

The Brand method was not employed in treatment, sponging and occasional antipyretics taking its place. Antityphoid serum had no effect in a few cases to whom it was administered.

Typhoid Infection without Intestinal Lesions.—Lartigau (*New York Medical Journal*, July 29, 1899) reports two cases proving at autopsy to be general infections with the typhoid organism, though without any traces of intestinal lesions.

The first case, after two weeks' illness, showed a moderately high temperature, with cough and shortness of breath; six days after admission the

patient had a series of convulsions, with retraction of the neck and dilatation of the pupils, and during the night a chill, death ensuing shortly after. At autopsy, in addition to a pyocyaneus bronchopneumonia, there were red and white infarctions in the liver and kidneys. Lymphomata could be demonstrated in the liver and cloudy swelling of the cells. From the liver, gall-bladder, kidney, and urine typhoid bacilli were isolated in pure cultures. The patient's blood after death gave a distinct Widal reaction.

In the second case death ensued three days after an operation for ectopic pregnancy; the autopsy showed an acute splenic tumor, cloudy swelling of the liver and kidneys, and endometritis; operation wound clean and sterile. Typhoid bacilli were isolated from the liver, gall-bladder, and kidneys; typhoid bacilli and streptococcus from the uterus; pneumococci from heart blood and spleen. Blood post-mortem gave distinct Widal reaction. No intestinal lesions were to be seen, nor were changes in the mesenteric or retro-peritoneal glands made out. It can be objected that in the patient's history there is mention of a three weeks' febrile attack, occurring four months previously. The author considers the wide dissemination of the organisms and their unusual localization to indicate a more recent infection. A very interesting feature in this case is the polybacterial infection present—typhoid, streptococcus, and diplococcus apparently all playing a part.

Etiology of Malarial Fever.—THIN refers to the already well-known researches of Ross and Manson on the theory of inoculation by mosquitoes, and to Grasse's experiments in 1898, which apparently limit the power of inoculation to certain genera of mosquitoes. Bignami's experiments, at first negative, later positive, when the particular "genus" was allowed to bite the subject, are to THIN very conclusive. Bignami's and Bastianelli's results allow them to conclude positively that "the 'genus' of mosquito, *anopheles claviger*, may be made to bite a subject suffering from malarial fever, and then, if kept at the proper temperature (30° C.) for the number of days requisite for the development of the sporozoites, may inoculate healthy patients by this bite. These patients will develop malaria, usually within a certain time, the parasite being the same as was present in the first instance."

According to GRASSI, BIGNAMI, and BASTIANELLI, the temperature at which the mosquito host is kept influences materially the development of the parasite. In mosquito bodies kept at 15° C. after biting no development occurs, the most favorable temperature being from 20° to 30° C. When crescents have been taken up by the mosquito they remain almost unaltered for some hours: at forty hours a distinct nucleus can be made out, with central chromatin and the protoplasm is vacuolated; after six days the large swollen parasites are seen in the thickness of the middle intestine bulging into the lumen, and are found to be composed of a number of small bodies, sporoblasts, which, becoming sporozoites, burst from the capsule into the intestine and are distributed throughout the mosquito body, being found in great numbers in the tubes of the salivary glands. In tertian fever the mature non-sporulating forms develop in the anopheles; some slight differences from the subsequent developmental processes of the crescents are to be made out, and Bignami and Bastianelli describe a female form, "malthrogameti," and a male, "mithrogameti." The observers were unable to show

that the mosquitoes transmitted the sporozoites to their offspring, experiments in this line being negative.

Other spore-like bodies are to be seen in mosquito bodies, the nature of which is as yet undetermined.—*Philadelphia Medical Journal*, August 12, 1899.

SURGERY.

UNDER THE CHARGE OF

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The Formation of a Cleido-humeral Nearthrosis.—OLLIER (*Rev. de Chir.*, July 10, 1899) reports in detail the results of an operation which he had previously mentioned in a communication to the Académie des Sciences. The patient had received an injury in the battle of Metz, which had necessitated the removal at various times of different parts of the scapula and the upper portion of the humerus. He was left with a defective shoulder, which prevented any use of the arm, although the forearm muscles were intact and functionally capable; the upper arm had no point of fixation, and the arm was consequently helpless. The only bony point to which it could in any possibility be attached was the end of the clavicle, from which the proximal end of the humerus was separated by a distance of 7 cm., which was filled up by dense cicatrices. Various forms of apparatus had been tried without success, and operation was demanded. He resected a piece from the end of the humerus subperiosteally, and attached it by two silver-wire sutures to the freshened end of the clavicle, uniting the periosteum by catgut sutures, and attaching such of the tendons to the humerus as were available of those forming the shoulder-joint and springing from the scapula. A portion of the deltoid remained attached to the clavicle, though somewhat atrophied; the remainder, that could be separated from the cicatricial tissue, was attached to the trapezius muscle and other portions to the fibrous tissue surrounding the extremity of the clavicle, thus forming a digastric muscle. The dressing applied was occlusive and the healing rapid; the arm was, however, kept in a fixed position, with the idea of obtaining bony union. It was apparent that this was not practical without the loss of the muscular development of the arm, and the dressing was therefore arranged so that the muscular stimulation could be applied to the deltoid and other muscles surrounding the shoulder. When it was seen that bony union was not probable, passive motion was employed and the arm dressed, so that the forearm muscles could be exercised. There was thus formed a fibrous union between the

bones which permitted considerable motion. The silver suture could not be felt, as plastic exudate had covered it over. There was, of course, a considerable shortening in the upper arm, but the patient at the end of six months could carry a weight of 40 kgs., and flex the forearm with a weight of from 12 to 15 kgs. The condition continued to improve till the arm could be abducted to a right angle with the body and he could lift a weight of 57 kgs. from the ground without any apparent separation of the new joint.

There was complete tolerance of the silver sutures, which never produced any irritation. One of them, however, tore out. The radiographic examination was very instructive. The head of the humerus, which had been rarefied in its structure, was shown to have thickened. While one of the silver sutures had been torn out, the other apparently did not serve to hold the bones together, but only acted as a point about which the bone moved. The movement of abduction showed that the inner silver wire had torn out of the humerus. No true articular cavity could be detected, and the joint was probably entirely fibrous in its structure.

This operation is indicated only when there has been total loss of the scapula and a portion of the humerus. Where a typical resection can be made subperiosteally, there forms in young subjects sufficient new bone for the strengthening of the joint and the preservation of its functional usefulness. In older subjects, although new bone may not form if the periosteum can be preserved and the attachments of the muscles to it, the fibrous tissue formed will be sufficient to secure a useful arm. The important feature in all such resections is to maintain the integrity of fibrous tissue, uniting the various groups of muscles that form the power of the joint and enter into the formation of the articulation.

Nerve Complications in Fractures of the Lower End of the Humerus.—BROCA and MOUCHET (*Rev. de Chir.*, June 10, 1899) find that there are a number of causes which can account for injuries of the nerves in this region. They divide them into primary and secondary groups. These groups are according to the etiology and treatment required. There is also a third class, which is made up of injuries that are manifested only at a remote period after the injury is sustained.

The primary injuries are complete section of the newer partial or complete tears; stretching by a dislocated fragment of bone; a fragment completely detached may press upon and injure the nerve; it may become impacted between the fragments. The most frequent source of this class of injuries is a contusion. It may have any degree, may produce permanent paralysis, with an ascending neuritis as a complication, in spite of the most skilful surgical intervention. The ulnar nerve, on account of its superficial situation, is most liable to these injuries, and when this nerve suffers injury it is more liable to be caused by a contusion than by the fracture which has taken place near it. It is well to remember that these serious nerve injuries may take place after a very simple injury of the elbow, where such complications are not suspected. The paralysis does not always become evident at the time of the fracture, and may not show itself till the week following. It may not appear till after the nerve has been enveloped by callus, the two causes acting together to produce the injury.

The injury produced by secondary causes may be from a callus or by a fragment that has not been completely reduced. The callus when exuberant may envelop the nerve for some distance, and produce its effect by compression. The injury produced by fragments not completely reduced is, these authors believe, the most frequent of all sources of nerve injury in these fractures. Before the employment of the Röntgen rays cases were very frequent in which exuberant callus produced nerve injury. Since the introduction of this positive and accurate method of diagnosis it has been shown that these bad results were more frequently due to partially reduced fragments than to callus. Exuberant callus was blamed where vicious position was at fault. In fracture about the elbow the supracondyloid fracture, in a diagonal plane through the lower portion of the humerus, is the one most likely to result in this form of injury, the proximal fragment overlapping the distal anteriorly, and exerting pressure with its point upon the nerve. The authors have confirmed the evidence given by the skiagraph in two instances of this character by operation and relief of the condition. A spicule of bone implanted in the nerve has been reported as one of the secondary causes, but it is probably very rare in actual practice.

The evolution of these paralyses from a clinical stand-point varies very much according to their etiology. In certain cases it is insidious; there is only a slight tingling sensation or sharp lancinating pains in the nerve, then little by little there appears a functional impotence in the muscles supplied by that nerve. This is the type of paralyses due to compression. Those due to primary injuries are more rapid in their development. The motor function, instead of being gradually progressive in its impairment, reaches the maximum at first. This is what happens in the section or the contusion of nerves where the injury is severe. Some cases recover of themselves; others are permanently injured, while there are cases all the way between. Degeneration may take place, the patient presenting with acute spontaneous pains, more or less marked, a hyperæsthesia more or less extensive, cramps, and fibro-tendinous retractions. The injury may not be more than a traumatism, or it may reach the spinal cord and give rise to the vexatious symptoms of an ascending neuritis.

The surgeon should always make a careful examination in these cases after he has been called, and tell the family if any nerve lesion is present, and also that there is a possibility of one developing. It should always be borne in mind that there may be present hystero-traumatisms in adults or in children. The difficulty, however, is not to recognize the presence of the paralysis, but to determine the nature of the lesion. *A priori*, in the presence of primary paralysis a contusion should be suspected. The interposition of the nerve between the fragments is rare and readily recognized by pressing the fragments together. The section of the nerve is rare; it is probable when a paralysis occurs immediately after the accident, although a contusion has always to be considered.

During the period of callus formation the diagnosis can be readily made by the aid of the Röntgen rays. A malposition is the most frequent cause. The course of the nerve should be carefully palpated and any irregularity noted. In practice electrical examination alone will determine the amount of the paralysis and injury of the nerve and the prognosis.

The treatment is entirely dependent upon the condition and its early recognition. A section, if recognized immediately after the injury, demands immediate surgical intervention. Careful examination by electricity must at first determine the extent of the injury, and its exact location must be definitely determined before intervention can secure valuable results. In cases where the cause is an overlapping fragment, the portion producing the injury should be excised. By far the better plan is to prevent these injuries by determining by the Röntgen rays the exact nature of the osseous lesion, and by ascertaining after its reduction, by a second skiagraph, that perfect coaptation of the fragments has been secured. Where true exuberant callus is present the nerve must be freed.

Delayed Suturing in Packed Wounds.—KÖPPEN (*Cent. f. Chir.*, July 1, 1899) calls attention to the fact that it is not good surgery to place stitches in the flaps of the wound, which it is necessary to pack with gauze. There are many reasons why this should not be done. If we are uncertain of our asepsis sufficiently to make it necessary to pack the wound, there is no logic in putting in sutures while the wound is septic. They may become infected and lead to stitch abscesses after the gauze packing has been removed and the wound closed; they will frequently become weakened while the surrounding tissues may become the seat of a phlegmonous infiltration. The sutures can be readily inserted at a later period by the use of a eucaine B. solution—eucaine B. 0.1, salt 0.8, water 100. This solution anæsthetizes the part sufficiently to permit the insertion of the sutures, and in addition permits the removal with a curette of the granulations that have formed, so that a more nearly primary union will be the result.

Three Cases of Urethral Calculi Impacted in the Lower End of the Ureter, and Removed by Suprapubic Cystotomy.—BISHOP (*Edinburgh Medical Journal*, July, 1899) reports three very instructive cases of this condition, which he believes is not so infrequent as is generally supposed. Some calculi become impacted in the ureter, and if they do and are not removed, the consequences are extremely serious. If the impaction is double —*i. e.*, on both sides—anuria results, with death on about the thirteenth to the twentieth day. If single, and the impaction is absolute, intense pain, followed by atrophy of the corresponding kidney, occurs. If the impaction is not complete, or if the stone is shifted from time to time, hydronephrosis, with intermittent attacks of renal colic, possibly pyonephrosis or pyonephric abscess, with their concomitants, are the result. There are three places where these calculi tend to lodge, although they have been found in other portions of the tube. They are at the infundibulum, about the brim of the pelvis, and at the vesical end. The impaction at the vesical end is the result of the normal narrowing of the ureter and the presence of additional fibres which make it valvular at this point. The irritation produced by its passage causes contraction, which aids in dislodging the calculus if it is short, but is unable to force along an oblong calculus, which is the type generally found impacted. If the calculus projects into the bladder, and is rough, fresh salts are deposited upon it. If, on the other hand, it is smooth or flush with the orifice, the urine from the other kidney acts upon it and washes part of it away.

Of the three cases reported two were in males and one in a female. In the first there were symptoms of stone present, but none had been detected by previous examinations. When examined a calculus was found which did not change its position, and was apparently encysted. Suprapubic cystotomy showed it to have occluded the ureter and to lie in its orifice. The stone was removed and the patient recovered. The second patient was a lady of thirty-five, married thirteen years, with no children or miscarriages. She had had renal symptoms for twenty-two years, and had complete suppression at twenty-two. The symptoms had been aggravated at menstrual periods, and both ovaries and tubes had been removed. There was an intermittent hydronephrosis, with paroxysms of renal colic. The calculus was not to be felt by vaginal examination, but could be readily detected per rectum. The urethra was dilated and the stone felt, but it could not be moved. Suprapubic cystotomy was at once done, the ureter slit up on the calculus, and the calculus removed. Absolute anuria, up to forty-eight hours, followed the operation, then death occurred. No post-mortem was allowed. The third case was a boy of seven years, who had symptoms of vesical calculus, and one was removed at a subsequent operation. The patient, however, did not get on well, and while examining per rectum for an abscess a calculus was found impacted in the right ureter. It was removed by the suprapubic opening, and the patient made a rapid recovery. The author believes that the suprapubic route is the best for the removal of these calculi, except in the female, when it can be detected per vaginam.

The Sterilization of Catheters and Bougies.—NICOLL (*Annals of Surgery*, June, 1899) has made a careful critical study of the different forms of bougies and catheters upon the market and of the various methods of sterilization which have been proposed. The results arrived at from this exhaustive research are not altogether definite, nor is he inclined to be dogmatical; they are, however, of great value to those who constantly employ these instruments. He finds that the ordinary bougie, either metallic or soft, can be rendered sterile by washing carefully and drying with a towel or gauze, rendered sterile by boiling. The use of antiseptic solutions is unnecessary; they injure the outer texture of the instrument, and this makes infection more liable. As soon as they become scratched or injured metal bougies should be polished and re-plated, while soft ones must be thrown away.

The problem in connection with catheters is rendered more difficult by the inability to reach their interior and the difficulty experienced in making this smooth in the manufacture. Metal or Jaques' soft rubber catheters can be rendered positively sterile by boiling or washing, and soaking in strong antiseptic solutions that do not injure them. It is, however, impossible to render gum-elastic or varnished catheters sterile when for any reason they have to be employed, as where the surgeon cannot himself use a metal instrument for the patient, and a stiff one is required. A gum-elastic catheter that is smooth and well finished inside may be rendered reasonably secure by having the patient hold it for a time under a tap and then lay it aside immersed in a boric solution, a weak perchloride, or other weak antiseptic solution.

He has made it his rule to use bougies in preference to catheters wherever it is possible. Where a catheter has to be employed, he uses a metal or a soft

rubber one. When the urine is purulent or septic the catheter must be destroyed if it is not metal or soft rubber. Where there is not much pus or infection it can be washed, immersed in antiseptic solutions, and steamed internally.

A Device for Washing out the Pelvis of the Kidney Through the Ureter.—By an ingenious combination of instruments already in every armamentarium, TUCKERMAN (*Clev. Med. Gaz.*, June, 1899) has been able to irrigate the pelvis of the kidney and the ureters through a Kelly speculum. The method is described as follows: "This device consists of a No. 6 French catheter, an ounce bulb, and the common exploring aspirator, with the ordinary three-way stop-cock, all connected by rubber tubing. The catheter is introduced in the ordinary manner through the Kelly speculum. It is necessary to use a stylet in the catheter, passing the catheter up as far as possible without force, then withdrawing the stylet a couple of inches, passing the catheter further, and so on, until the pelvis of the kidney is reached, then, by exhausting, the contents of the pelvis of the kidney can be drawn into the bulb and inspected. From the amount of fluid which is drawn into the bulb we may judge of the capacity of the pelvis of the kidney. If pus be present, and it be deemed advisable to wash out the kidney, the bulb can be detached from the catheter, filled with boric-acid solution, or such other disinfecting fluid as the practitioner may desire, and, by reconnecting and reversing the stop-cock, the fluid can be injected into the pelvis of the kidney, again withdrawn, new fluid reinjected and withdrawn, until, as in washing other cavities, the fluid comes away clear. Then, if it be desirable to medicate the pelvis of the kidney, the bulb can be filled with the proper quantity of medicament, which in its turn is forced into the pelvis of the kidney, where it is left by the withdrawal of the catheter."

The author has used this device with success. He has dilated the stricture of the ureter in three sittings up to No. 8 French, washed out the pelvis, and decreased its capacity by relieving it of the pus which it contained.

Post-anæsthetic Paralyses.—MALLY (*Rev. de Chir.*, July, 1899) cites a number of instances in which paralyses central, hysterical, peripheral, or reflex, have been detected after the administration of a general anæsthetic.

Regarding the peripheral paralyses, he says they are generally due to compression. They are more numerous than one might at first suppose, as many of them pass unnoticed, the patient recovering before being able to leave the bed after the operation, so that they are not noticed. If, however, they are carefully questioned, many will admit that they have had a numbness or tingling which has not amounted to much. The anæsthetic cannot be considered as the cause of this, except that the unconscious patient has been unable to defend himself against cramped positions and overstretched limbs.

The paralyses that are reflex and those that are hysterical in their character have nothing to do with the anæsthetic. The central paralysis due to cerebral hemorrhage are very rare where the anæsthetic has provoked the arterial rupture in a purely mechanical manner.

The treatment should be preventive, sufficient care being exercised to prevent the patient from receiving injury by pressure through awkward posi-

tions during the operation. The cerebral and hysterical should be treated on principles applicable to these conditions. The use of electricity and massage is advised for the others.

PEDIATRICS.

UNDER THE CHARGE OF

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AND

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X-Ray Examinations in Children.—FRANCIS H. WILLIAMS (*Boston Medical and Surgical Journal*, July 13, 1899, p. 41) confirms his earlier opinion of the value of X-ray examinations in young patients. Children and infants are more easily penetrated by the rays than adults, and, like older persons, may be readily examined without removing the clothing, as they lie on the stretcher in front of the apparatus. Infants often go to sleep while on the stretcher, and may be then examined with the fluorescent screen, or an X-ray photograph may be taken without disturbing them. Thorax, abdomen, and head are all more accessible to this method of examination in children than in adults. In examining the thorax, indeed, care must be taken to avoid too much light, for the organs in the chest of a young child are so easily traversed by the rays.

In some cases of pneumonia, especially in the early stages, where physical signs are vague, a doubtful diagnosis may be made more certain by an X-ray examination. The author mentions a case in point of a child six years old, admitted to his ward with high fever, leucocytosis, pain and stiffness in the back of the head and neck, the neck being so rigid it could not be flexed. There was no history and no physical signs were found in the chest by three physicians who examined him. An X-ray examination revealed a dark area over one lobe, and a shortened excursion of the diaphragm on that side; a diagnosis of pneumonia was made without hesitation. This was confirmed by a marked crisis and a rapid clearing of the lung as determined by X-ray examinations. At no time during the course of the disease were the signs of consolidation obtained by auscultation and percussion.

In cases of suspected tuberculous meningitis a careful X-ray examination of the lungs will be of value in determining the presence of tuberculous foci therein.

In pleurisy, with effusion or empyema, the X-rays assist greatly in diagnosis, any condition of the lung making it less penetrable to the rays, or a change in the excursus of the diaphragm, or changes in the size, position, or shape of the heart being easily demonstrable.

The size and position of the liver and spleen are more readily determined in children than in adults; likewise the size and position of the kidneys, especially the left one.

The size of the stomach may be determined after giving subnitrate of bismuth with bread and milk.

The author has made about 3000 examinations, and has never had any untoward effects.

Pathological Anatomy of Acute Anterior Poliomyelitis.—HAGENBACH-BURCKHARDT (*Jahrbuch f. Kinderheilkunde*, 1899, Bd. xlix., S. 112) reports the post-mortem findings in a case of acute poliomyelitis consecutive to a burn. The patient was a boy, aged eleven months, who sustained a burn of the second degree upon the forehead from hot coffee. The next day he had vomiting, followed on the succeeding day by fever, chills, loss of power in the arms and legs, and could not sit up nor hold up the head. The patellar and cremasteric reflexes were abolished. There was no ocular disturbance and no involvement of the face. Sensation appeared to be preserved. Respiration was frequent and superficial; the urine scanty, infrequently passed, and containing a little sugar, but no albumin. The temperature varied from normal to 101°, the pulse from 150 to 200. The child died on the fourth day, dyspnœic and cyanosed.

The diagnosis of poliomyelitis was verified at autopsy. There were multiple foci in the cervical and lumbar region of the cord, the gray substance being softened, and, in some foci, hemorrhagic.

Microscopically there was observed fatty degeneration of neurogliar cells, cellular infiltration of vessel-walls, hypertrophy of axis-cylinders, and disseminated hemorrhages. The greatest intensity of these lesions appeared in the lumbar region and in the left anterior horn of the dorsal cord.

The Presence of the Klebs-Löffler Bacilli in the Air of a Diphtheria Ward.—H. RICHARDIÈRE and L. TOLLEMER (*Gazette des Maladies Infantiles*, 1899, No. 10) have made an interesting series of experiments to discover whether bacilli were present in the air of apartments devoted exclusively to the treatment of diphtheria patients before and after disinfection had been practised. These observations were made in the Bretonneau pavilion of the Hôpital Trousseau.

In the first series of experiments the wards had not been disinfected for several weeks. They contained about thirteen diphtheria cases. Two procedures were adopted: in the first the air of the rooms was driven over sterilized bouillon; in the second, Petri dishes containing coagulated beef serum were exposed to the air for varying periods of time. Bacteriological tests were controlled by inoculation of animals. Similar experiments were also made in apartments which had been occupied by diphtheria patients, but had subsequently been disinfected.

The result of these observations showed that virulent diphtheria bacilli were present in the dust floating in the air of the Pavilion Bretonneau, which had not been disinfected for a long time, but that they were absent after disinfection. These experiments, therefore, show the importance of frequent disinfection of wards devoted to contagious cases and the necessity

for the precautions of rigid isolation which are carried out in these wards at the present time. They show, also, that it is necessary to employ daily some means of removing, without at the same time stirring up, the dust of such apartments.

Rhinitis Externa Due to the Bacillus of Löffler in Children Convalescent from Scarlatina.—TODD (*Lancet*, May 28, 1898) has found in 365 children convalescent from scarlatina, examined during a period of eighteen months, that 51, or 14 per cent., presented a rhinitis externa due to the bacillus of Löffler, which was virulent for guinea-pigs. The affection was contagious. There was no false membrane, but the nasal mucosa was red, swollen, and easily ulcerated. In many of the cases there was scattered over the body a secondary eruption of pustules, containing at first the Löffler bacillus and later staphylococci. In no instance was the diphtheria bacillus found in the throat or in the posterior nares; there was no angina or croup, no glandular swelling, elevation of temperature, nor albuminuria. Beside these microbes there were varieties of staphylococci, and rarely streptococci.

Lumbar Puncture followed by Relief of Symptoms.—J. MADISON TAYLOR (*Therapeutic Gazette*, April 15, 1899) records four cases of meningitis, with symptoms of acute hydrocephalus, in which withdrawal of cerebro-spinal fluid by lumbar puncture was followed by more or less improvement, with saving of life in three of them. The first case, in a boy of two and a half years, was reported as one of chronic leptomeningitis, with purulent otitis media. Two punctures were made about a month apart, 35 and 41 c.cm. of fluid being drawn off. Marked improvement continued as long as the child remained under treatment. Case II. is described as one of acute hydrocephalus, with rapid aggravation of symptoms, in a boy, eight months old. Thirty c.cm. of fluid were withdrawn. Several hours later it was noted that there was marked lessening of the tension in the fontanelle; that the pupils, which had been irregularly dilated and irresponsive to light, now responded to the light stimulus, and seemed almost normal; that the pulse had become steady, and that spasmodic movements had decreased. The child has remained under observation for over a year, and is very well except for a slight condition of hydrocephalic deformity. Case III. was reported at length by Dr. Edwin Rosenthal in *Pediatrics*, November 1, 1897, and is referred to in abstract. It is described as acute hydrocephalus. Eighty c.cm. of fluid were removed, in which no tubercle bacilli were found. Temporary relief followed, but after twenty-four hours the severe symptoms recurred, and the child died of exhaustion six days later. Case IV., in an infant of seven months, was probably one of simple posterior basic meningitis, characterized by convergent strabismus, general convulsions, retraction of the head, etc. Ten c.cm. of fluid were withdrawn, in which no bacilli were found. Pressure symptoms were at once relieved. After four months' observation the child seemed to be perfectly well.

Infectious Icterus in Childhood.—KISSEL (*Jahrbuch f. Kinderheilkunde*, Bd. xlviii., S. 235) presents a study under this title based upon ninety-six cases observed in children from one to thirteen years of age. Twenty-two

are reported in detail. In none of the series has it been possible to establish a precise etiology; the children presented no special feature in their development or in their state of nutrition; they were not particularly subject to gastro-intestinal affections. The onset was sometimes insidious, but usually was sudden and accompanied by fever, headache, and chills. Jaundice appeared ordinarily on the third or fourth day, sometimes at the end of a week. The urine became highly colored; the stools pale. In only three cases did the urine contain a small amount of albumin. The liver and spleen were ordinarily increased in volume and were painful to pressure. Slowing of the pulse was noted in only three cases. Temperature was usually elevated during the first three or four days. The duration was three or four weeks. Of the ninety-six cases six died, all of them with symptoms of cholæmia.

Cardiac Murmurs without Organic Lesions in the Eruptive Fevers, Particularly Scarlatina.—L. D'ANFREVILLE DE JUSQUET DE LA SALLE (*Thèse de Paris*, 1898), in a thesis devoted to this subject, refers to the frequency with which inorganic murmurs are encountered in the eruptive fevers, especially during the convalescence from scarlatina. They are observed more frequently in females, with whom the proportion reaches 66 per cent., and more commonly between the ages of fifteen and twenty-five years than with the very young or old. Those of feeble constitution, or those who have had previous cardiac affections, seem to be predisposed. These murmurs have no importance as regards the duration, course, or termination of the disease.

While adopting the rules formulated by Prof. Patin for diagnosticating such murmurs, the author criticises and rejects the cardio-pulmonary theory of their origin. He regards them as due to myocarditis, producing a diminution of tonicity of the cardiac muscles or disturbances of its innervation. Either microbic toxins or exhaustion of the heart may be at the root of the trouble.

The density of blood of such patients does not seem to be inferior to that of the average case.

In closing, the author concludes, from his own experience, that digitalis and caffeine seem to act favorably upon these organic murmurs, while vasodilators, bromide of potassium, iodide of sodium, and nitroglycerin tend to increase them, and vaso-constrictors appear to have no effect at all.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Neutralizing Power of Calmette's Antivenomous Serum: Its Value in the Treatment of Snake-bite.—DRS. W. SEMPLE and G. LAMB assume, from experiments, that 15,432 grains of antivenomous serum will neutralize

0.015432 grain of cobra venom, and therefore 225 grains of serum would be required for this amount of venom. When snake-bite is treated, soon after it occurs, with an intravenous injection of antivenomous serum, the authors show by experiment that the result is the same as that obtained when done in glass vessels in the laboratory. Disregarding cases where death occurs very rapidly (probably the venom is injected directly into a vein), death usually occurs after several hours. During the interval the poison is gradually absorbed. If 225 grains or more of antivenomous serum be introduced into the blood, before the lapse of such time as is required for the absorption of a lethal dose of the venom, recovery should take place.—*The British Medical Journal*, 1899, No. 1996, p. 781.

On the Use of Diphtheria Antitoxin in General Practice.—Dr. J. R. Armstrong sums up abstracts from the cases of a number of patients, some of whom were treated with antitoxin, others not. He concludes that where the antitoxin was used (although only for patients who were very seriously ill) recovery was much more rapid. The throat symptoms cleared up in half the time. The average time for the membrane to disappear from the throat is two and three-quarter days. In non-injected patients five and two-third days elapse, on an average, from the commencement of treatment. Disappearance of the membrane in both methods of treatment marks a distinct improvement in the patient's condition. In the patients treated with antitoxin convalescence has practically begun, while in non-injected patients signs of weak heart action continue for some time longer. The former are up and about during the second week; the latter remain ill several weeks longer. The mortality in the former was 9 per cent., and in the latter, who were mildly affected, 20 per cent. Antitoxin is to be used in all except the very mildest attacks of diphtheria. The author compares the results obtained in his own practice, mortality averaging $3\frac{1}{4}$ per cent., with that in the practice of others not using the antitoxin so freely, with a death-rate of $17\frac{1}{2}$ per cent., and deduces that antitoxin is not so frequently used as it should be. Fifteen hundred units—the liquid and not the dried serum being used—is injected under the skin of the abdomen. Very infrequently a second injection is required after an interval of two or three days. The indication for repetition being absence of improved general condition and continued presence of the membrane after three or four days, option should be given every patient as to injection in very mild attacks, and in all but these injections should be insisted on. Perchloride of iron, acetate of ammonia, and brandy should also be given internally.—*The Lancet*, 1899, p. 574.

Complications of the Serum Treatment of Diphtheria.—Dr. Charles Bolton believes the blood-serum to be responsible for the rashes, pains, and fever, for these occur whether the horse from which the serum is taken be immunized or not. Large and multiple doses increase the frequency of the rashes. Adults are more liable to severe pain than children. The severity of the attack of diphtheria and the day of the disease on which antitoxin is administered do not affect the rashes and pains. The rashes are of two kinds, often occurring together—urticarial and erythematous. The latter are divided into four sub-groups: (1) Resembling erythema multiforme.

(2) Simple erythema. (3) Scarlatiniform. (4) Morbilliform. The scarlatiniform rash appears much earlier than the morbilliform eruption, corresponding with the periods of incubation of scarlet fever and measles. All forms of rashes have their beginning, apparently, in the vicinity of the injection, and are more marked in this region. When joints and adjacent tissues are painful there may be slight swelling, but it is exceptional to find fluid, and the overlying skin is usually normal. Acute rheumatism is simulated, the condition lasting four days. Hips, knees, wrists, and hands are most commonly affected. The rash usually appears first, and the pain subsequently. Rise of temperature is most frequent when the rash and pain are both present; it rarely occurs when there is pain only. Enlarged glands and otitis media often accompany the febrile movement. The temperature-curve is irregular, varying between 100° and 105° F.; it is especially high when pain is present, and with the morbilliform rash. Albuminuria was found in about 50 per cent. of the cases. The amount was small, and it was present a short time only. Abscess at the seat of injection is due to injection through the needle; it is more frequent in septic cases and where scarlet fever is present. Healing quickly follows incision. Bruising of the tissue is present in 8 per cent. of the cases; it lasts from four to seven days. Sloughing occurred in one fatal case. Constitutional disturbances consist in rigors, convulsions, and rise of temperature; somewhat later rashes may appear. The author considers the complications of antitoxin treatment very painful at times, but quite harmless.—*The Lancet*, 1899, p. 891.

The Etiology and Treatment of Neurasthenia.—Drs. J. Collins and C. Phillips recommend prophylaxis against the development of this disorder. The offspring of neurotic parents are to be reared with extraordinary care. An attack having once occurred, another is always likely to follow. The individual's life-habits are to be studied and regulated. Though the physical element plays a large part in an attack of neurasthenia, still it is largely the mind of the patient that requires treatment. Psychical treatment consists in obtaining the confidence of the patient, and suggestion is often invaluable. Added to these are:

1. Hygiene, including dietetics. 2. Hydriatic measures. 3. Electricity, rest, exercise, and massage. 4. Climato-therapy. A proper amount of sleep is insisted on. Often neurasthenic patients will already have used hypnotics until they no longer react. Coupled with hydriatic measures, etc., sleep can be produced. Isolation, either complete or partial, is recommended under general hygiene. Where the patient dwells mainly on the condition of his viscera, it is wise not to lay any stress on his dietary, but to suggest wholesome food and the use of coarse, green vegetables, together with plenty of water to drink, large movements thereby resulting. Patients should be assured that no organic or irremediable condition is present. Mixed diet, as a rule, is preferable. When milk is tolerated it should be added to the regular diet. It is best given a half-hour before or two hours after a meal. Frequent feedings are also serviceable. Stimulants in general are to be forbidden or not, depending on the patient's habit and how he reacts to them. If there be any connection between any stimulant and the development of the neurasthenia, its use is to be stopped at once. Hyperchlorhydia

is to be treated by regulation of the diet, reduction in the amount of animal proteids ingested, and increased quantities of vegetable proteids and easily digested starches; also milk, with an alkali, is indicated. Where lavage has become a habit it is decidedly injurious, and should be stopped. Constipation is very often present, and is due to sluggish peristalsis and insufficient water; and strychnine and belladonna, with abdominal massage, are indicated. High oil enemata are recommended. The authors prefer the simple douche and cold pack among hydriatric measures. Electricity is of less value than water in treatment; the kind used is of little importance; its beneficial action is largely psychic. Climato-therapy amounts to little. Improvement is more often due to change of surroundings than to climatic conditions. "Travelling for health" is considered detrimental in the large majority of instances. Medication is often to be prohibited instead of prescribed. Treatment in sanatoria provided with hydriatric and other equipment has little in its favor. It is inimical to individualization, and is rarely of value.—*The Medical Record*, 1899, vol. lv. p. 413.

Benzine in Anæsthetic Mixtures.—Dr. Horatio C. Wood, Jr., records his experiments to determine the correctness or falsity of the statement that benzine serves as a "nearly inert" diluent in anæsthetic mixtures, and, indirectly, the advisability of further clinical trials of it. Benzine, or petroleum-ether, is not a definite chemical compound, but a mechanical mixture of several hydrocarbons of the marsh-gas series, its specific gravity and boiling-point differing, within certain limits, according to the predominance of pentane or hexane. He shows definitely that it is by no means devoid of toxic properties. As its anæsthetic action is a very feeble one in comparison with its effect on the respiratory centre, it is to be expected that the use of it as a "diluent" in anæsthetic mixtures must increase their action on the vital functions more than on the sensory system, and, therefore, render them more dangerous. The advantages claimed for these new anæsthetic mixtures are less excitement, it is more pleasant to take, it has greater rapidity of action, and is cheaper—in other words, much the same advantage that chloroform has over ether. When, however, we study those symptoms, giving us an indication of the relative danger of the mixture, we find, first, that the percentage of instances of cyanosis is rather high. Again, several observers have noted that the respiration often stopped suddenly without previous warning, and one or two have observed sudden collapses. Several instances of bronchopneumonia (one fatal) have been noted. Most observers failed to find any signs of subsequent nephritis, but albuminuria does occasionally occur. Vomiting seems to be about the same as after ether.—*Philadelphia Medical Journal*, 1899, vol. iii. p. 843.

Antipyrine in Menstrual Epilepsy.—Dott. Wiese Francini had treated a patient with the three bromides without result. Commencing a few days before the expected period, three or four times daily a powder containing five grains of antipyrine and two grains of sodium bicarbonate was administered. For the first time in five years this period passed without symptoms. The continuance of this treatment at subsequent periods was successful.—*Gazetta degli Ospedali e delle Cliniche*, 1899, No. 34, p. 367.

Spinal Elongation in the Treatment of Tabes Dorsalis.—Dr. Jean Leclerc describes an apparatus in use at the Salpêtrière for temporarily lengthening the spine. Based on the fact that stretching the sciatic nerves results in an altered blood-supply to the lower part of the spinal cord, the attempt is made, by mechanically elongating the spine, directly to attain the same result in the region of the posterior columns undergoing sclerosis. Suspension of the body simply is sufficient, as is shown by the persistence of curvatures of the spine. By this apparatus curvatures are noticeably diminished, and the spine is literally stretched. This is true of the whole length of the spine. There is frequently an abnormal laxity in the articulations, the nerve-trunks become adapted to the increased movement of the joints; they elongate and permit the lower part of the spinal cord to ascend in the canal, without itself being properly elongated. Therefore, hyperextension of the legs is added, the patient being placed on an inclined plane. The apparatus is complicated. Elongation by cervical traction usually gives good results; sometimes headache follows, and scapulo-dorsal traction is substituted. Dragging sensations in the spine and extremities prove the reality of elongation. Pulse and respiration are normal; there is no facial congestion and no increase of arterial tension. Elongation should be practised every two days; more frequently used it is harmful. Average duration is ten minutes, but at first three minutes suffice. Contraindications: Disease of the heart and vessels; aneurism, emphysema, cachexia, and laryngeal crises. In abnormal spinal rigidity or laxity, and in obesity, success is more doubtful. In all stages of tabes, if none of the above complications are present, much improvement follows, "elongation" acting remarkably well in disorders of sensory nerves, both superficial and deep. Theories of how elongation of the cord acts beneficially are: Altered blood-supply, meningeal or neurogliar rupture, and stretching of the nerve-sheaths. None of these have been demonstrated. Results of treatment are: Improved general condition, the pain diminishes, crises are of short duration. Painful phenomena of the second stage of tabes, except crises, are not much improved. Retention of urine is cured in a short time. Incontinence is often much improved, but more slowly. It is sometimes wholly cured. Seminal losses are unaffected, but impotence is entirely cured and coitus rendered possible after a month of treatment. Motor inco-ordination is much improved, the result being more satisfactory than that obtained by teaching the patient to guide his movements by vision. Gastric crises in one patient were entirely cured. In another they were much reduced, both in frequency and intensity, one attack occurring every third day instead of fifteen daily. Improvement is to be looked for after fifteen or twenty elongations. If there be no change after forty applications it is useless to continue longer. Treatment is indicated while there is either superficial or deep sensory disturbance. Four months of treatment are to be followed by one or two of rest; another period of treatment is to follow.

Painful symptoms can thus be made to disappear wholly in some patients, the Argyll-Robertson pupil and Westphal's symptoms alone remaining. The author maintains that such a patient is functionally cured.—*Revue de Thérapeutique*, 1899, No. 7, p. 221.

The Therapeutic Value of Paraldehyde.—Dr. John V. Shoemaker states that beside producing sleep this remedy serves several other important purposes. Restlessness, agitation, and dyspnœa are markedly diminished under its influence. The headache, frequently combined with the symptoms mentioned, will often yield to this remedy. In its elimination by the lungs it exerts a beneficial action upon the respiratory passages, improving the character of the secretions and discharges, tranquillizing the action of the muscles of the chest and restoring the normal rhythm. From this association of properties this remedy is beneficial in insomnia, whether of the simple variety or that dependent upon organic disease. It is advantageous in chronic bronchitis, asthma, dyspnœa of the functional variety, or that due to disease of the heart, lungs, or kidneys. In some convulsive disorders decidedly good results have been reported.—*Merck's Archives*, 1899, No. 3, p. 181.

Dr. William Mackie first used the drug for spasmodic asthma, and finds it also very serviceable in both functional respiratory troubles and dyspnœa arising from various causes, even when complicated by grave organic lesions. Paraldehyde, if continually exhibited, loses its power, but not so rapidly as do many other drugs of the same class. The best method of giving the drug is with an equal amount of syrup of orange-peel or syrup of humidesmus, freely diluted with water. In the presence of tinctures it becomes fairly miscible in water.—*The Lancet*, 1899, p. 756.

The Therapeutics of Heat and Light, and Electric Heat and Light Baths.—Dr. H. L. Jones speaks of a paper by Winternitz describing electric light baths. A wooden cabinet is arranged for the reception of the patient's body. Within are incandescent lamps and reflectors. The patient is subjected to both the light and heat from the lamps. This cabinet has been found useful in the treatment of rheumatism, asthma, anæmia, neurasthenia, and obesity. The rapidity with which diaphoresis (within five minutes) follows entrance into the cabinet is considered of importance. The temperature is only 81° F. The radiant heat penetrates the tissues more deeply, the effect is more stimulant, perspiration is more quickly induced, and the air about the patient is comparatively cool; these are the advantages of this apparatus over the ordinary hot-air bath. Whether the electric light rays play any part is unknown. Indications for the use of this method are the same as for the older ways of applying warmth. Radiant (electric) heat has probably no special therapeutic value which the older methods do not possess. Incandescent lamps are the quickest and cheapest of thermal generators. Workmen in the vicinity of arc lights are apt to suffer from effects much like sunburn; these effects are due to light and not to heat. Anæmia, especially, because occurring so often in patients deprived of sufficient light, might be benefited by a systematic course of treatment with the light of the electric arc. The arc light, either by the emission of ozone or by its light, is a powerful deodorizer of noxious smells.—*The British Medical Journal*, 1899, No. 1994, p. 658.

Ice or Heat as a Local Application.—Dr. W. Ewart recommends ice-massage in rheumatoid arthritis and allied conditions. Relief of pain is immediate, and lasts for a considerable time. From the writings of Arnott

(1864) the author quotes successes with freezing mixtures of ice and salt, the pain of sciatica, lumbago, and neuralgia being invariably relieved. Ice-massage is equally efficacious and free from danger. Pleuritic pain accompanying pneumonia of the base is immediately relieved for several hours. The systematic use of the spinal ice-bag is recommended in chronic rheumatism and lumbago. Recently functional aphonia has been cured by freezing the skin with methyl chloride over the spot where the superior laryngeal nerve sends an internal branch to the larynx. Laryngismus stridulus, spastic aphonia, and in the laryngeal crisis of tabes it is also serviceable. Neuralgia and peripheral neuritis are also improved. The linear application of extreme cold (styppage) can be used for relief of neuralgia.—*The Lancet*, 1899, p. 957.

Syphilis Treated by the Intravenous Injection of the Mercury Cyanide.—Mr. A. Chopping makes the following claims for this method: 1. The patient is under daily observation. 2. The exact amount of the drug introduced is known. 3. Rapidity with which the effect of the drug is produced and serious lesions disappear. It is particularly of use when other methods have failed. Of eighty-four thus treated all but one showed very marked improvement. Adjuvants were cod-liver oil, iron, and hygiene. In the tertiary stage and in patients showing rupia, iodides of sodium and ammonium were used. The writer thinks there is little risk attending this method. Ordinary asepsis is to be practised. The veins of the forearm are preferable, a rubber tourniquet being applied to the upper part of the arm. Twenty minims of a 1 per cent. solution of the cyanide of mercury are introduced in the direction of the blood stream. A typical sensation is imparted to the fingers when the needle has entered the vein. The tourniquet is removed and the injection made. It is to be repeated daily unless diarrhœa results, and this rarely occurs. The injection is painless unless the vein is missed, when acute swelling and pain follow. These latter will yield to hot fomentations, though sometimes persisting for several weeks. Bruising of tissues around the vein can be overcome by using a pine needle.—*The Lancet*, 1899, p. 432.

Cantharides in Chronic Parenchymatous Nephritis.—Dr. Julius Salinger believes this drug to have distinct curative powers, as well as being valuable as a diuretic in nephritis. The tincture is the best preparation, and is to be given in small doses (one or two minims), as an overdose is easily irritating to the renal epithelium. In two cases quoted at length, dropsy and marked oliguria were speedily benefited and cured. The following prescription was found satisfactory: Iron and ammonium acetate, half an ounce and tincture of cantharides, two minims.—*The Therapeutic Gazette*, 1899, vol. xxiii. p. 295.

A Note on Sparteine Sulphate.—Dr. P. M. Chapman believes that in certain selected cases, chiefly those characterized by cardiac dilatation, arising so far as we know by an accumulation of residual blood, this drug is invaluable. The dose should be one-half to one grain every four hours. A slight purgative action, and most frequently an increase in the urine follows, and thus the drug may be called a mild hydragogue diuretic.—*The Birmingham Medical Review*, 1899, vol. xlv. p. 279.

GYNECOLOGY.

UNDER THE CHARGE OF
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Effect of Intra-uterine Injections on the Ovaries.—GRAMMATIKATI (*Vratch, La Gynécologie,* April, 1899) bases the conclusions in this communication upon a case in which 115 intra-uterine injections were given in the course of three months, during which time menstruation was suppressed. At the end of this period the tubes and ovaries were removed. The ovaries were generally anæmic, contained but few primordial follicles, and their tissues were poor in cells—in short, there was no indication of functional activity.

The writer infers that injections exercise an inhibitory action on ovolution. In the case reported the solution consisted of 45 grains of alumnol in 3 ounces each of alcohol and tincture of iodine. No unpleasant symptoms followed the daily treatment.

Curettement in Ectopic Gestation.—SMOLSXY (*Ibid.*) opposes Nyder's recommendation to employ diagnostic curettement in cases of suspected tubal pregnancy, on the ground that the results of the microscopical examination of the tissue removed are not positive, and may lead to erroneous conclusions. He reports a case in which he used the curette three days after pseudodecidual membrane was expelled, and was unable to find any trace of decidual cells, the only change being occasional glandular hypertrophy. Ten days later the gravid left tube was removed by abdominal section. A microscopical examination of the membrane expelled showed the large decidual cells, with absence of uterine glands and chorionic villi, regarded by Abel as characteristic of ectopic gestation. But if Nyder's conclusions were correct, it would have been inferred that the tumor palpated on the left side of the uterus was *not* a gravid tube, as it proved to be.

Intermenstrual Pain.—FASSINA (*Thèse de Paris;* abstract in *La Gynécologie,* April, 1899) observed that certain women suffered from recurrent attacks of pain at a definite time between the menstrual periods—from twelve to fifteen days after the last menstruation. The pain was situated either in the ovarian or hypogastric region, and was accompanied by an aqueous or sanguineous discharge, the phenomena lasting two or three days, being rarely prolonged until the next period. The attacks were always acute, but the pain was unlike that of either salpingo-oöphoritis, pelvic peritonitis, or oöphoralgia. The exact cause of the intermenstrual pains is not clear. Whether they represent a recurrent process of ovulation or a supernumerary menstruation, there must be a sudden congestion of the ovary, leading to vasomotor disturbances of the uterus, as shown by the mucous or bloody discharge. Slight lesions of the ovary in neurotic subjects are doubtless the main factors in the production of the intermenstrual crises.

Treatment of Inoperable Carcinoma of the Cervix Uteri.—GOTTSCHALK (*Centralblatt für Gynäkologie*, 1899, No. 3) commends the following method of treating inoperable cancer of the cervix: After thorough cauterization of the ulcerated surface, a circular incision is made with the Paquelin cautery in healthy vaginal tissue, and the cuff thus formed is turned downward over the diseased area and kept in contact with it by a gauze tampon, which is left in situ for a week. A cicatrix results, which occludes the vagina transversely and resists the invasion of the disease for five or six months, during which time the patient remains free from hemorrhage and foul discharge.

Preservation of the Ovaries After Hysteromyomectomy.—WERTH (*Centralblatt für Gynäkologie*, 1899, No. 22) opposes Abel's view that there is such an intimate trophic relation between the ovaries and the corpus uteri that there is no object in pressing the former in cases of laparomyomotomy unless a portion of the body of the uterus is left. He reports seventeen cases, six of which had been under observation for over three years, in twelve of which at least a portion of one ovary was saved. Twelve patients were free from the usual climacteric disturbances following the operation, although in every instance the uterus was amputated at or below the level of the os internum.

In order to insure sufficient blood-supply to the ovary, the writer advises against the employment of mass-ligatures, and recommends that the gland be sutured to the stump of the uterus with the peritoneum. In one instance in which the spermatic vein was ligated hemorrhagic infarctions were afterward found in the ovary. In the case of a patient who died of pulmonary embolism four weeks after operation, the establishment of a free collateral circulation to the ovary was demonstrated.

FRITSCH (*Ibid.*), on the contrary, always removes the ovaries, believing that post-operative nervous disturbances are inevitable in certain subjects, and that it is exceptional for these to be severe.

If an ovary be left there is danger of the formation of adhesions and of degeneration of the gland, on account of interference with its vascular supply —both of which results he has observed in the course of secondary operations.

Steam in the Treatment of Uterine Hemorrhage.—DÜHRSSEN (*Berliner klin. Wochenschrift*, 1898, No. 36) reports the following cases:

Case I.—The patient, aged thirty-seven years, had been exhausted by profuse and persistent menorrhagia. Steam was introduced into the uterine cavity for two minutes. Nine days later a cast was thrown off, consisting of the endometrium and subjacent muscular layer. Three weeks later the steam was used again for one minute and a half. As a result, the uterus underwent complete atrophy.

Case II.—The patient had flowed almost daily for four years, having been curetted four times and received various local applications, without result. Steam was used for two minutes, the usual slough following. The patient menstruated twice during the next three months; the uterus then atrophied, and its cavity became obliterated.

In a third case, amenorrhœa persisted for six months after the treatment, the uterine cavity being presumably obliterated. In the fourth hemorrhage was due to a small fibroid, curettement being employed without benefit.

Bleeding, which had persisted for over three weeks, ceased after vaporization had been used for one minute. At the end of nine weeks the patient had a scanty menstrual flow, the uterine cavity being much diminished.

In consequence of his experience in these cases the writer advises that in young women the vaporization be employed not over fifteen seconds, not being repeated until after the next menstruation. The cervix should be dilated beforehand, and care be exercised to surround the steam-pipe with a non-conductor, to avoid cauterizing the tissue. He has also found this method of treatment useful in septic and gonorrhœal endometritis, provided that the rule is observed of not allowing the steam to escape for more than a quarter of a minute.

Ultimate Results of Castration for Fibromyoma.—WINTERNITZ (*Ibid.*) quotes Saexinger's statistics, including fifty-one operations with eight deaths. Thirty-nine patients were kept under observation during periods varying from three to sixteen years; of these both ovaries had been entirely removed in all but three.

In 88.8 per cent. the hemorrhages entirely ceased; in 83.3 per cent. the tumor certainly diminished in size. In three cases only did it continue to enlarge, twice on account of sarcomatous and once from cystic degeneration.

In spite of these favorable results, the writer thinks that castration cannot be compared with the radical operation, the mortality of the latter being as low as 2 per cent. in some hands. The palliative operation should accordingly be reserved for a limited class of cases in which, on account of the condition of the patient or the anatomical conditions, removal of the uterus would be attended with too great risk.

Changes in the Endometrium in Fibroid Uteri.—BARREMANS (*Revue Internat. de Méd. et de Chir.*, 1899, No. 6) does not agree entirely with those pathologists who affirm that fibromyomata are usually accompanied by glandular endometritis. He has found that while the deeper layers of tissue show a glandular change, the more superficial present the microscopical appearances of an interstitial endometritis. Under increased blood-pressure, or venous obstruction, the vessels may rupture when the glands in the deeper layer are found to contain blood-corpuscles and coagula. The glands invade the subjacent muscular layer, and may even invade the myoma.

This hyperplastic form of endometritis is the rule; the mucosa is seldom atrophied except when it is strongly compressed by fibromyomatous nodules.

Effect of Castration on Growth of Bone.—SELLHEIM (*Centralblatt für Gynäkologie*, 1899, No. 23), from experiments on various young mammals, found that after removal of the ovaries the growth of the long bones was retarded and the pelvic diameters became distended. The bones of the skull remained soft, and these sutures did not unite.

Transplantation of the Ovaries.—RIBBERT (*Archiv für Entricklungsruechaink der Organismen; Centralblatt für Gynäkologie*, 1899, No. 23), in experimenting with guinea-pigs, found that within thirty days after transplanting ovaries to the uterine cornua or broad ligaments, the tunica albuginea and

germ epithelium were nourished directly from the peritoneum; so that the primordial follicles retained their normal appearance. On the other hand, the struma, with the larger follicles, was destroyed, its place being taken by a new growth of connective tissue derived from the peritoneum.

Contrary to Arendt's observations, he found that progressive changes took place in the transplanted gland, the primordial follicles maturing and encroaching upon the struma more actively than in the normally situated ovary.

When examined after an interval of three months, instead of atrophy taking place, there was an actual increase in the development of the ova.

Treatment of Stenosis of the Cervical Canal.—Several articles on this well-known theme have appeared during the past year. CHABRY (*Revue de Gyn. et de Chir. Abdom.*, 1899, No. 3) reports several cases in which Pozzi's discission and plastic operation was performed, with the following results: All the cases of dysmenorrhœa and cervical endometritis were cured; five women out of fifteen became pregnant, pregnancy and labor being free from complications; the os externum and cervical canal remained permanently normal.

BARONE (*Arch. di Ost. e Gin. Centralblatt für Gynäkologie*, 1899, No. 18) believes that divulsion is an imperfect operation; he prefers Sims' method of discission, because the results are more permanent. Of ten patients upon whom this operation was performed five became pregnant.

PETRI (Inaugural thesis: abstract in *Centralblatt für Gynäkologie*, 1899, No. 18) reports thirty-two cases of discission of the cervix for stenosis by Glaevecke, with twenty-one patients cured and eight relieved. A glass drain was always used. Parametritis occurred in two cases and crural phlegmasia in one. Three patients conceived (one in the tube), one patient being delivered at term. No return of the stenosis was noted after three years.

Relation between Biliary Colic and the Uterine Functions.—CARNILLON (*Rassegna di Ost. e Gin.; Centralblatt für Gynäkologie*, 1899, No. 18) calls attention to the fact that attacks of biliary colic often occur at the beginning of the menstrual period; when the attacks are frequent and long-continued the period is often irregular, even when the pelvic organs are quite normal. At the approach of the climacteric the attacks may return, with increased severity, being sometimes attended with menorrhagia. During pregnancy they often cease, to return with the first period, or after lactation has been suspended.

Colicky attacks may be induced by operations on the uterus or adnexa, even in cases in which the patient has had no previous history of gallstones.

The Ovaries in Osteomalacia.—BULINS (*Beiträge zur Geb. u. Gyn.*, Band i., Heft 1) describes the microscopical changes in six ovaries removed from patients with osteomalacia. Nothing distinctive was found, nor were the changes constant, being chiefly the usual hyalin degeneration, vascular dilatation, etc. The writer infers that no conclusions with regard to the origin of osteomalacia can be drawn from an examination of the ovaries; in fact, the etiology of the disease is still obscure.

OBSTETRICS.

UNDER THE CHARGE OF

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Pregnancy Complicated by Ovarian Cysts.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, 1899, Band ix, Heft 4, BRAUN reports two interesting cases of pregnancy complicated by ovarian cysts.

The first was that of a woman, aged thirty-three years, who had borne children, but with difficulty. The use of forceps and craniotomy on one occasion had been necessary at her labors. She also had hæmatoma of the vulva after one labor. In the pregnancy under consideration a tumor occupied the space behind the uterus, deep in the pelvis. From its consistence and position a diagnosis of dermoid cyst was made, and careful examination showed that the tumor was so firmly adherent that it could not be pushed out of the pelvis.

Accordingly, the operation was undertaken by vaginal incision. Under chloroform narcosis the posterior vault of the vagina was widely opened, when it was found possible to push the tumor down by supra-pubic pressure, puncture it with a trocar, and thus remove the tumor entirely. There was profuse hemorrhage, which necessitated the sewing together of the peritoneum and edges of the vaginal wound. It was found that the sigmoid flexure was so closely adherent to the tumor that in separating it the outer layer of the bowel was torn. This was repaired with fine silk, the vaginal wound closed through the greater part of its extent, and a drain of iodoform gauze placed in the wound. The patient made an uninterrupted recovery and the pregnancy was uninterrupted.

Braun's second case was that of a woman, aged forty-three years, a multipara, whose eighth pregnancy had proceeded to the eighth month. A tumor was found behind the womb, so large that it was impossible to remove it through the vagina. Accordingly, the patient was delivered by Cæsarean section and the uterus closed in the usual manner. It was then possible to turn out the ovarian cyst and to remove it without puncture. Its pedicle was divided into three portions and hemorrhage prevented in this manner. This patient also did well, and her pregnancy was not interrupted.

A Case of Inoperable Dermoid Cyst Complicating Pregnancy.—In the *Annales de Gynécologie*, April, 1899, HERRGOTT reports a case of a patient who had a cystic tumor filling the pelvis and dipping deeply down upon the right side. She was so far advanced in pregnancy that induced labor was not appropriate. The tumor could not be dislodged, and accordingly the patient was delivered by Cæsarean section. The wound in the uterus was

closed by catgut. The patient bore the Cæsarean operation fairly well, but lost blood and became weakened. On examining the tumor after the uterus had been emptied it was found so firmly adherent that operation at that time was declined, and the abdomen was closed.

The recovery of the patient was complicated by infection in the uterine wound originating in the catgut employed. Suppuration occurred and a fistula opened into the uterus. Through this several long strands of catgut were removed, and the patient finally recovered from the Cæsarean operation.

Two Unusual Cases of Ectopic Gestation.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, Band ix., Heft 4, THOMSON reports two interesting cases of ectopic gestation from the hospital at Odessa.

The first was that of a multipara, in whom a tubal pregnancy upon the right side could be clearly diagnosticated. The symptoms were typical, and finally rupture occurred, for which abdominal section was performed, and the tube and pregnancy removed. The patient made a good recovery, but shortly after leaving the hospital complained of similar symptoms, referable to the left side of the pelvis. She again entered the hospital, and it was found that tubal pregnancy existed in the remaining left tube. This was removed by vaginal section, some difficulty from bleeding being experienced and controlled by packing with iodoform gauze. The patient ultimately made a good recovery.

Case second was that of a multipara who came to the hospital complaining of abdominal pain following an abortion. On examination there was a tumor in the lower part of the abdomen and bulging in the posterior wall of the vagina. The diagnosis of ruptured ectopic gestation was made, with the formation of hæmatocele, and the tumor was opened without anæsthesia through the posterior wall of the vagina. A profuse discharge of dark blood followed, which yielded to drainage and douching. The patient gradually made a complete recovery.

The Intra-uterine Cry.—Cases in which the child has been heard to cry in the mother's womb have been reported, but many of them rest upon very insufficient observation. GUMMERT (*Monatschrift für Geburtshülfe und Gynäkologie*, 1899, Band ix., Heft 4) was able to find thirty-three reported cases, seven of which seem to have been carefully observed. He adds to this number an interesting case occurring in his experience, as follows:

The patient was a multipara, with a flattened pelvis, a much relaxed and dilated birth-canal, which had been lacerated and not closed, and with partly dilated cervix. The child was in brow presentation and the membranes ruptured. Gummert determined to perform version, and accordingly introduced the right hand into the birth-canal, when air was felt and heard to enter the birth-canal as the operator's arm dilated it. As the hand grasped the foot which lay nearest the child was distinctly heard to cry. There were present a midwife, the family physician, and the husband of the patient, beside the operator, and each of these persons could distinctly recognize the fœtal cry. The patient was immediately anæsthetized, and version proceeded readily until the extraction of the head, when some difficulty was experienced. To the astonishment of all the child was not asphyxiated, but

was vigorous and cried immediately after birth. Mother and child made a good recovery.

The circumstances of this case were remarkably favorable for this occurrence. The relaxed and widely open birth-canal, the ruptured membranes, the very relaxed uterus, the brow presentation of the child, and the introduction of the hand for version enabled air to proceed directly to the fœtal mouth. It is somewhat difficult to understand why the child cried, as the placental circulation was not interfered with. The most natural explanation lies in the reflex irritation produced primarily by the hand of the operator, and secondarily, by the air entering the birth-canal.

Radiography of the Pregnant Uterus.—Numerous attempts have been made to secure an outline of the fœtus in utero by the Röntgen rays. Some years ago the reporter succeeded in obtaining a tracing of the cranium and skeleton of a living child in the womb of its mother in the ninth month of pregnancy. A clear outline, however, was difficult at that time to obtain.

In the *Annales de Gynécologie*, April, 1899, VARNIER calls attention to his report, made at the Congress in Moscow, and to further experiments upon the cadaver which he has carried on with the Röntgen rays.

Dim outlines were obtained upon the living pregnant patient, but no clear picture. Recently by lengthening the time of exposure Varnier was able to secure an outline of the contour of the fœtal head, and also to determine whether or not it had entered the pelvis, and to obtain an idea of its volume, of its position, and of the degree of flexion and engagement. When these pictures were made with the mother in the dorsal position no tracing was obtained of the vertebral column of the mother nor of the fœtal limbs. This at present seems to be the extent to which this method of diagnosis is applicable in the study of obstetrics.

Two Successful Cæsarean Sections.—In the *British Medical Journal*, May 6, 1899, MADDEN reports from the hospital at Cairo two successful Cæsarean sections.

The first was an Egyptian woman, a rhachitic dwarf. She was not in labor when admitted, but was kept under observation and operated upon so soon as labor began. The method employed was the usual one, so far as incision of the uterus was concerned. The uterine cavity was irrigated with hot, sterile water, and a large drainage tube passed, extending from the cavity of the uterus to the vaginal orifice. Interrupted silkworm-gut stitches were used to close the uterine wall, and the Fallopian tubes were divided by silk ligatures to prevent further impregnation. The abdominal wound was also closed by interrupted silkworm-gut stitches.

The second case was also a rhachitic dwarf, who was much exhausted in labor, and who was delivered as rapidly as possible after admission. The method of operating was the same as in the first case, except that no drainage tube was employed. After the operation the patient collapsed, but subsequently rallied. Many of the stitches suppurated, and the uterine discharge was offensive. This finally ceased, and the patient was transferred to the medical ward, where she subsequently died from pulmonary complications.

On post-mortem examination the lungs were found extensively diseased. The wound in the uterus had healed. The ligatures on the divided ends still held, and were closed in a mass of connective tissue.

[These cases are interesting because of the employment of buried silkworm-gut in the abdominal wall and the ligation and excision of the Fallopian tubes to prevent conception. This method of operating we believe to be much inferior to hysterectomy with intrapelvic treatment of the stump.—ED.]

Atrophic Marasmus of Nurslings.—In the *British Medical Journal*, May 6, 1899, BAGINSKY contributes a paper upon this subject. From his studies in infants dying with gradual wasting he believes that a chronic catarrhal inflammation of the intestine is the cause of this condition. He found repeatedly on post-mortem examination inflammatory proliferation of the small intestine at its upper part. In the lower portion the changes were of an atrophic nature. Accompanying this there is extensive atrophy of the wall of the intestine, and this extends throughout the entire length of the digestive tract. All the layers of the bowel are affected, the result being that the child cannot digest food, and hence perishes of starvation.

Cases are occasionally found in which anatomical changes cannot be demonstrated, but such are the exception and not the rule.

The Iodine Reaction in Leucocytes in Puerperal Septic Infection.—In the *Berliner klinische Wochenschrift*, 1899, No. 6, KAMINER reports the results of his investigations upon eighteen cases of puerperal septic infection. He was able in these cases to demonstrate distinct reaction with iodine, caused by an unknown substance in the leucocytes of the patient's blood.

Wounds of the Nipple in Lying-in Patients.—In the *Archiv für Gynäkologie*, 1899, Band lviii., Heft 2, PLATZER contributes a paper with the foregoing title. His studies were made in the clinic at Budapest, and his material comprised one thousand patients. He found that the only cause for lesions of the nipple in these patients was nursing. Three factors tend to bring this about: First, the bite which the child gives with its gums; second, the traction which it makes upon the nipple, and, third, the maceration of the epithelum of the nipple caused by the mother's milk and the secretions from the child's mouth. The stronger the child seizes the nipple and the longer and more vigorously it pulls, the greater is the danger of wounding. Badly formed nipples are more apt to be injured than those well developed. Over one-half of the patients had lesions of the nipple, and these were more frequent in primiparæ than in multiparæ. Of the former 60 per cent. had well-developed nipples, while of the latter 90 per cent. It is found that the tendency to wounding grows less after each confinement.

These injuries may be divided into two general classes—in one, in which a portion of the nipple is actually removed, while in the other a superficial part of the nipple is wounded without a deep lesion. The first class are called excoriations and the second fissures. Excoriations arise from bruising the nipple by the jaws of the child. An extravasation of the blood occurs between the epidermis and the true skin. As nursing proceeds the cover of

this tumor gradually disappears, and there is formed a moist wound. This heals slowly under the constant irritation of repeated nursing.

The second class of lesions occurs where the fissure forms between the epidermis and the true skin. This fills with clear fluid, forming one or more vesicles. These disappear after several hours, a crust taking the place, which is soon torn off. This makes a wound, which heals slowly under the influence of nursing. Maceration itself rarely causes a wound, but it is an important factor in preventing the healing of injury and in increasing the lesions. Fissures of the nipple are caused by a congenital condition of the skin covering the nipple. The epidermis is much thinner than any other portion, and hence a wound easily occurs. This begins as a very small wound, but extends deeply into the connective tissue of the nipple. They heal very slowly because the margins of the wound are separated at each nursing. Ulcers upon the nipple may follow after any wound. They are caused by infection, usually of a mixed nature, and resemble ulcers on other portions of the body.

Wounds of the nipple usually occur on both sides, and are very apt to happen repeatedly in the same patient. They generally occur during the first week after the birth of the child, and none were found later than the seventh day of the lying-in period. Most of them heal within ten days, while some persist several weeks. During the usual period of hospital treatment 30 per cent. of fissures failed to heal, and but 15 per cent. of excoriations; 2 per cent. of cases having fissures developed mastitis, and but five-tenths of 1 per cent. of those having excoriation only.

Wounds of the nipple are diagnosticated by pain which the patient has upon nursing. In four of these cases this pain was so great that nursing was abandoned. Fever is not caused by clean wounds of the nipple. In each case where fever was present mastitis existed as a complication. Slight fever occurred where ulcers formed. The onset of mastitis was indicated by a marked rise of temperature. So far as treatment was concerned, massage and washing was sufficient in most cases during pregnancy. Compresses of 2 per cent. carbolic acid solution were especially valuable when a wound had occurred. Dry dressings were tried, but were not found available. The mouth of the child was not washed out in these cases. Of the two treatments, the dry sterile dressing was found the better in simple cases of excoriation. Where fissures existed, carbolic compresses were found better.

When wounds of the nipple occurred it was found very advantageous to stop nursing for one or two days. In cases of mastitis nursing must be suspended. The secretion of milk did not cease in these cases unless nursing was omitted for as many as five days.

The use of the nipple shield was especially advantageous and undoubtedly prevented many wounds of the nipple. Ulcers upon the nipple were washed twice daily with 1 : 1000 bichloride soluton, and then powdered with dermatol. They rapidly cleaned in one or two days. Where mastitis was threatened nursing was at once stopped, and the breast bandage and an ice-bag applied. These measures usually sufficed to prevent the formation of pus.

The reviewer desires to call attention to the excellent result obtained by treating all puerperal women with sterile breast dressings. These are kept

in place by a breast binder, with shoulder pieces which enable the nurse to compress each breast as its condition indicates. This simple device, with the use of the nipple shields, has in our experience rendered wounds of the nipple and severe lesions exceedingly rare.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Mobility of the Artificial Eye after Enucleation.—PRIESTLEY SMITH, referring to the imperfect mobility of the artificial eye worn after enucleation, and its sunken position, points out the importance of any measures that will do away with these drawbacks without impairing the advantages which this operation has over the substitutes that have been proposed for it. The mobility of the artificial eye will vary with the way in which the enucleation is performed. If the conjunctival bed on which it will rest is to move in association with the remaining eye its connections with the muscles and the integrity of these latter must be preserved with the utmost care.

Acting on a suggestion of H. Schmidt, to fasten the recti muscles to the conjunctiva by suture, Smith has devised the following procedure, which he practises as the first step in the enucleation of the eye. The globe being rotated strongly outward, a narrow horizontal fold of the conjunctiva over the internal rectus is pinched up, so as to include the subjacent connective tissue and muscle, and a black silk suture is carried through these structures by means of a curved needle. To pinch up the muscle it is necessary to use very fine forceps with sharp teeth, and to press the tips firmly into the tissues. The suture is tied firmly, but not too tightly. A second suture is applied in like manner to the external rectus, and the upper and lower recti may be treated in the same way.

The nearer to the canthus one places the tips of the forceps the easier it is to make sure of picking up the muscle; but if the suture be placed too near the canthus the movement of the conjunctiva may be restricted rather than increased.

The enucleation is carried out with care, to divide the conjunctiva as close to the margin of the cornea as possible, to separate the tendons with the least disturbance of Tenon's capsule, and to avoid cutting the sutures in the process. Patients treated in this way usually left the hospital as after an ordi-

nary enucleation, on the fourth or fifth day, and the sutures were removed a week later.

Smith also points out that the artificial eye should be in every way less conspicuous than the real eye it is supposed to match, however lustreless that may be. The white of the eye should be no whiter, the pupil no blacker, the corneal margin no better defined, and the visible portion a little smaller than that of the real eye. We frequently recognize the artificial eye by its superior size and brilliancy, rather than by its defect of prominence and mobility.—*Ophthalmic Review*, May, 1899.

H. SNELLEN (Utrecht) points out that artificial eyes were used before it became customary to enucleate the eye for serious injury or disease. The shell-shaped prothesis was especially planned to be worn over a retained shrunken eyeball, and does not answer the purpose well after enucleation.

In seeking a form better adapted for use after this operation, he first tried filling the concavity of the usual artificial eye with plaster-of-Paris or with gutta-percha. He found that in spite of its greater weight the patient preferred an eye so filled in to one of the usual form. Subsequently, he had the same forms worked out in glass. He finds there is need for three distinct forms of artificial eye—viz., the shells now generally employed, which are especially suited for use over a shrunken eyeball or after a Mules operation; a form of double-walled shell, concave backward, for use with a smaller stump, as after simple evisceration, and an artificial eye-globe, flattened posteriorly, to use after an ordinary enucleation.—*Klin. Monattsblätter f. Augenheilk.*, March, 1899.

[The plan of making the artificial eye to fit the orbit after enucleation seems more rational than the attempt to make the orbit fit a form of artificial eye not designed for it by inserting "artificial vitreous" bodies of glass, silver, aluminum, or rubber. That the mobility of a well-fitted artificial eye may be greatly increased by some such procedure as that described by Priestley Smith must seem probable to one who has carefully watched the influence of the ocular muscles on the form of the conjunctival sac after removal of the eyeball.—ED.]

Fatal Hemorrhage from the Conjunctiva.—A. J. ABBE (Fall River) reports a case of hemorrhage from the conjunctival surfaces of the lids which proved fatal within fifty-two hours after birth. At birth the left upper lid appeared red and swollen, and twelve hours later a thin straw-colored discharge was noticed, for which a 6 per cent. solution of silver nitrate was instilled, a drop in each eye. In two hours there was a bloody oozing from the left eye, and four hours later a steady trickling of blood. One hour after that the right eye began to bleed. There was no bleeding from any other point. The mother was healthy, and no case of hæmophilia was known in the parents' families. Pressure had but slight effect in controlling the hemorrhage. Abbe collected a number of recorded cases of severe or fatal hemorrhage from the conjunctiva. In the two cases in which it occurred within a few days after birth it followed the instillation of solutions of silver nitrate. —*Annals of Ophthalmol.*, January, 1899.

[Cases of serious hemorrhage following the use of silver nitrate solutions in the eyes of the new-born are so rare that the risk ought not to prevent

the use of such an efficient remedy for ophthalmia neonatorum, or even its employment as a preventive measure (the Credé method), when there is a strong probability that the child's eyes have been exposed to infection. But it ought to be considered as having some bearing on the proposition that the eyes of all new-born infants be subjected to such treatment. It may be noted, as long ago pointed out, that applications of this drug to the conjunctiva should not be repeated so long as that membrane shows red or bleeding points due to a former application.—ED.]

Lymphoma of the Lids.—MYLES STANDISH (Boston) reports two cases. One case was that of a man, aged sixty-six years, who came for increasing difficulty of opening his eye, which had been noticed for about a year. He had previously undergone the removal of an enlarged tonsil, said to present a lympho-sarcoma. The growth was removed from the lids, and in two years had not returned. It was found soft, friable, and made up largely of lymphoid-cells having no definite arrangement with regard to the connective tissue stroma of the part.

In the other case, that of a woman aged sixty-three years, the tumors involved the lids of both eyes, and had been slowly increasing for five or six years. There were also small rounded growths in the pharynx. Five operations were done in eight months. The growths recurred and increased, and the pharynx became so obstructed that the patient could not breathe lying down. The administration of potassium arsenite solution was then commenced, the doses being increased to a maximum of ten drops three times a day. At the end of thirty days the tumors were diminishing in size; twenty days later they had decreased one-half, and before the drug was discontinued, at the end of four months, they had entirely disappeared.—*Trans. Amer. Ophthalmol. Society*, 1898.

[There are reported in ophthalmic literature a number of cases in which the diagnosis of sarcoma of the orbit and lids has been based on careful clinical, and sometimes microscopical, study of the case, but the patient refusing to submit to operation, the tumors have disappeared spontaneously. There can be little doubt that these cases are really similar to the above, and probably they would not present very great difficulties of diagnosis, now that it is recognized that such growths may occur in the orbit without marked evidence of lymphoid disease elsewhere.—ED.]

Lachrymal Disease.—H. D. NOYES (New York) strongly recommends the use of the style for many cases of lachrymal stricture. He prefers one made of puré silver, usually not larger than the No. 6 Bowman probe, and having the upper end bent so as to lie on the side of the nose close to the caruncle. It needs to be worn from four to twelve weeks, according to the pathological character of the stricture. After this mild irrigation of the passages with the aid of a dental syringe completes the recovery; but a large probe may be introduced once in two weeks, until it is evident that all tendency to relapse has disappeared. After dispensing with the style the entrance hole into the sac contracts, and for the passage of a probe this may need slitting up, and to sensitive people the use of either cocaine or nitrous oxide is desirable.—*New York Eye and Ear Infirmary Reports*, January, 1899.

Iritis of Nasal Origin.—E. LEFRANCOIS (Cherbourg) reports the case of a woman, aged thirty-two years, who came with iritis of the left eye of about three weeks' standing, corneal deposits, and vision reduced to 1/50. She was free from syphilis, gonorrhœa, rheumatism, or tuberculosis. The iritis was at first ascribed to menstrual irregularities, but menstruation soon became normal, and the iritis continued unimproved by treatment until the patient became discouraged and ceased attendance. After several weeks she returned with more violent inflammation of the eye, and it was then discovered that nasal obstruction had existed for several months. The right side of the nose was found normal, but the left contained a cheesy, fetid mass. The removal of this mass and cleansing of the nose restored it to normal. The inflammatory symptoms quickly subsided. By the end of the month vision had risen to 1/2, and three months later full vision had been regained.—*Recueil d'Ophthalmol.*, March, 1899.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Acute Diffuse Gonococcus Peritonitis.—CUSHING, in the *Johns Hopkins Hospital Bulletin*, May, 1899, describes two cases of diffuse fibrinous peritonitis secondary to salpingitis. In both cases gonococci were found in smears from the fibrin covering intestines and in the pus from the oviducts. In one case all cultures from the abdomen were sterile; in the other, in cultures from fibrin covering the liver and lining the pouch of Douglas, an abundant growth of the gonococcus was obtained.

In both cases smears from the urethra and vagina were negative, although both patients gave a history of gonorrhœa.

[With the exception of the case of acute pelvic peritonitis reported by Wertheim in 1882, these are the only reported cases of acute gonococcus peritonitis with satisfactory bacteriological examinations.]

On the Hitherto Undescribed Peptonizing Diplococcus Causing Acute Ulcerative Endocarditis.—MACCALLUM and HASTINGS (*Johns Hopkins Hospital Bulletin*, 1899, vol. x. p. 46) describe a micrococcus pathogenic for man which they found in a case of acute ulcerative endocarditis.

The organism was obtained in pure culture twice during life from the blood of the basilic vein, and at autopsy from the heart's blood and the aortic vegetations, as well as from infarcts in the spleen and kidney, and from the

lung. Sections of the aortic valve showed the fibrinous vegetations to be loaded with masses of diplococci.

The chief peculiarities which distinguish it from the pyogenic cocci already described are:

1. The mode of growth, which resembles that of the micrococcus lanceolatus, the diplococcus intracellularis meningitidis and the streptococcus rather than that of the pyogenic staphylococci.

2. The action on gelatin, which resembles that of the staphylococci.

3. Its activity in peptonizing milk and coagulated blood-serum, in which it differs from all the above-named pyogenic cocci.

In virtue of this last property they propose the name *micrococcus zymogenes*.

Contributions to the Study of the Bacterium Coli.—ESCHERICH, in his paper read before the German Congress of Internal Medicine at Carlsbad, April, 1899 (*Cent. f. allg. Path. u. Path. Anat.*, 1899, x. 413), stated that in cases of colitis contagiosa of children and allied disorders of adults the stools contain two varieties of colon bacilli. The blood of the patient exerts an agglutinative action upon bouillon cultures of one but not of the other.

As is well known, the term "bacillus coli" embraces a series of closely related bacteria. They have a number of properties in common, chief of which are gas-production and decomposition of proteids. The variations are apparently due to differences in the food-supply or soil upon which the organism develops.

The agglutination reaction shows that the race of colon bacilli normally present in the intestine varies with the individual. But in the same infant the same race is quite constantly found. Every individual has a special race in his intestines—not a confused mixture of bacilli introduced with the food. This "personal race," as Escherich terms it, is non-pathogenic as far as its host is concerned.

Infection with the bacillus coli can occur only when virulent forms gain access to the body.

Primary Melanosarcoma of the Rectum.—WIENER (*Beiträge zur path. Anat. und allgemeinen Path.*, xxv., Band ii., Heft s. 322) compares a primary melanosarcoma of the rectum in man with two similar cases in horses. Sections from similar tumors from various parts of the human body are described for comparison.

Tests for iron, to ascertain the hæmatogenous origin of the pigment, were negative.

The pigment masses are formed by coalescence of minute granules, since he found all gradations, from finely granular spindle-cells to large round-cells, filled with masses of pigment. Free pigment is due to the destruction of these older cells.

In the case he describes the primary focus was probably in the pigment-cells of the anal region, whence it infiltrated the submucosa.

He argues against the origin of these tumors from pigmented epithelial-cells, because the formation is most marked around the bloodvessels.

As an unexplained fact, he mentions the pigmentation of connective tissue

in the centre of some skin tumors. This was most like the deposition of pigment in tattoo marks. The epithelium of skin tumors is thinned mechanically by the growth below. Yet an ingrowth of epithelial cells into the underlying tissue does occur beyond doubt.

Wiener agrees with Oppenheimer, that the renal epithelium is colored a diffuse light brown.

Metastases in the liver may present circumscribed nodules or a diffuse infiltration.

As a general rule, in melanosarcomata in man the bloodvessels are involved, either by a perivascular growth or an invasion into the vessel wall, or an actual penetration of the intima and projection into the lumen. This condition has probably caused the statement that melanosarcomata arise from bloodvessels. The demand for abundant nutriment may affect this direction of growth. The dilatation of capillaries may be entirely explained by mechanical pressure. Metastases are primaly affected by the bloodvessels, and are most common in the brain and liver.

The differences in the character of the growth in horses are interesting. The tumors do not penetrate deeply and metastases are much fewer. The growths are harder, firmer, and the nodules are not so liable to softening. There is no perivascular arrangement of the cells, all of which are pigmented. There is much less tendency to malignancy.

Bone Formation in the Brain.—THOMAS (*Medical and Surgical Reports, Boston City Hospital*, 1899) reports a case of the formation of true bone in the brain, resulting from the presence of coccidia oviformia. The patient died of pneumonia, and the tumor had caused no symptoms during life. At the autopsy, aside from the condition found in the lungs, a small, calcareous mass was found in the anterior central convolution, which was atrophied. This mass, on microscopical examination, was found to consist of true bone (with laminations, lacunæ, and canaliculi), containing narrow spaces in which were œdematous connective tissue and occasionally large, granular connective-tissue cells (fat granule cells). Outside of the bone was a layer of osteoid tissue, and the whole was surrounded by a layer of increased neuroglia tissue—a secondary gliosis. Near the nodule were also seen long, spindle-shaped spaces surrounded by connective tissue and giant-cells, the areas resembling the granulation tissue sometimes seen around fat crystals. In the centre of the nodule was a large space filled with granular detritus in which were many small, oval bodies. These bodies, the coccidia, had a distinct capsule, occasionally double, and were either empty or filled with granular matter. The author concludes that the process was one of acute degeneration and softening of the brain from the presence of the coccidium oviforme, followed by encapsulation; the formation of fat crystals came from the breaking up of the myelin and other nerve substances and leucocytes; granulation tissue formed about this area, and was followed by ossification and secondary gliosis in its neighborhood. The author has been unable to find a similar case reported, unless it be that of Bidder, in Virchow's *Archives*, 1882, p. 91, who described rather vaguely a number of rounded bodies, which he took to be degenerated cells, in the centre of a bony tumor of the brain.

Thomas collected twenty-two cases of bony tumor of the brain, sixteen in the cerebrum, including one in the corpus callosum; five in the cerebellum, and one in the infundibulum. He concludes that the formation of bone in the brain is always a secondary process, sometimes occurring in new growths, but more often in connective tissue, such as forms after encephalitis of slight intensity.

Secondary Pneumococcus Infection.—DERFLOCQ and LEJONNE (*Soc. Med. des Hôp.*, Paris, November 25, 1898) report the following interesting secondary infections with the pneumococcus in a case of pneumonia: An arthritis, abscess of tissues around the larynx, hyperplasia of the inguinal and crural lymph-nodes, psoitis, and a terminal meningitis.

Urotropin as a Urinary Disinfectant.—M. W. RICHARDSON (*Journal of Experimental Medicine*, January, 1899) reports the result of the use of urotropin as a disinfectant for the urine in typhoid fever. He reviews his previous work on the bacteriological examination of the urine of thirty-eight cases, in nine of which he found the typhoid bacillus always in large numbers and practically in pure culture. The bacilli were found in the late stages of the disease, often persisting far into convalescence.

In the series which he now reports the typhoid bacillus was found in fourteen out of sixty-six cases examined. Nine of these cases were treated with urotropin, and in every case the bacilli disappeared from the urine. In seven cases, which were followed closely, the bacilli did not return. The urotropin was administered in doses of ten grains three times a day. With the exception of one case, in which two hundred grains were used, sixty grains or less were found sufficient to produce the desired result.

Urotropin, a compound of ammonia and formaldehyde, was first introduced by Nicolaier in 1898 as a disinfectant of the urine.

The writer considers the disinfection of the urine of typhoid fever patients as important a sanitary measure as the disinfection of the stools, and as it is impossible to make a bacteriological examination of the urine in all cases, advises the administration, during convalescence, of thirty grains of urotropin daily for ten days.

A Contribution to the Study of the Bone-marrow.—PIO FOA'S (*Ziegler's Beiträge*, Band XXV., Heft 2) contribution deals chiefly with the so-called giant-cells of the bone-marrow Flemming's and Hermann's solutions were used as hardening agents. For the reticulum of the bone-marrow and for differentiating the protoplasm of the giant-cells Mallory's stain gave the best results. Other stains used were those recommended by Ramòn Y. Cajal and by Van Gieson.

In man the protoplasm of the giant-cell is described as having three layers—an inner finely granular protoplasm which immediately surrounds the parts of the compound nucleus, an intermediate layer of thick fibrillar compact protoplasm which surrounds more or less completely the inner layer, and an outer layer made up of a reticulum of thread or cilia-like processes which are generally on the broader side of the cell-body.

These layers vary in different animals and in different stages of development and functional activity.

Multiplication of the nuclei of the giant-cells he believes to take place without division of the protoplasm There is no evidence of karyokinesis. It is a simple direct nuclear division which must be considered as a retrograde process leading to destruction of the cell.

He does not think that giant-cells form any of the blood-cells, or are formed by them. That the giant-cells contain, occasionally, a polymorphonuclear leucocyte indicates a phagocytic action rather than the formation of new cells. The theory of Heidenhain, that the presence of leucocytes in giant-cells indicates that the giant-cell is dead is not borne out by careful examination, for in all the cases the staining reaction gives no evidence of degenerative changes in the giant-cell, but does give evidence of changes in the included leucocytes.

By animal experimentation it was found that this phagocytic property of the giant-cells was increased by inanition, suppuration, exhausting hemorrhages, and by intravenous injections of lecithin, milk, and filtered cultures of the pneumococcus and the staphylococcus pyogenes aureus.

In all these cases emboli of giant-cells were found in the capillaries of the lungs, where they were destroyed, and never caused thrombosis. These cells reach the general circulation by being forced through the light walls of the marrow capillaries.

Foà believes the giant-cells to be formed from the true marrow-cells, which have much protoplasm and a single large vesicular nucleus with deeply stained border which contains a prominent nucleolus. These cells he has often observed showing different grades of nuclear division.

The article is illustrated by two colored plates showing thirteen figures.

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